

Best of 5

Anesthesia

1- Which of the following does not have a role in the management of chronic cancer pain?

- 1) Carbamazepine [0]
- 2) Clodronate [0]
- 3) Dexamethasone [0]
- 4) Nifedipine [0]
- 5) Pinaverium [0]

Pinaverium is used to reduce the pain duration in irritable bowel syndrome (IBS). Carbamazepine is in use for the treatment of neuropathic pain of malignancy, diabetes and other disorders. Clodronate inhibits osteoclastic bone resorption and is used to treat malignant bone pain and the associated hypercalcaemia. The corticosteroids are used to treat pain from central nervous system tumours. Reducing the inflammation and oedema relieves the pain caused by neural compression. Nifedipine helps relieve painful oesophageal spasm and tenesmus associated with gastrointestinal tumours. Painful bladder spasm may be relieved by oxybutinin.

2-On discovering an unconscious patient in a pre-hospital environment:

- 1) Rapid assessment of the airway and breathing is our primary objective [0]
- 2) Cross infection with *Neisseria meningitidis* may occur during CPR [0]
- 3) Two effective rescue breaths should be given once apnoea is confirmed [0]
- 4) On confirming an arrest, one minute of CPR should be performed before leaving the patient and getting help [0]
- 5) On confirming an arrest, a ratio of 15 compressions to 2 ventilations should be adopted at all times [100]

Assessing the environment to see if it is safe to approach is the first priority when considering providing aid to an unconscious patient. You do not want to become a casualty yourself! CPR related infections are extremely rare, although Tuberculosis, HIV and *Neisseria meningitidis* have all been recorded. Once it has been confirmed that the patient is not breathing you must get help or alert the emergency services, even if this means leaving the patient (this is especially important in a pre hospital environment). However, if the patient is an infant or child, a victim of trauma, a near drowning or if drug or alcohol intoxication is likely, then one minute of CPR should be performed before going for help. The correct ratio of compressions to ventilations is 15:2 regardless of the number of rescuers present.

3- Cannabinoids. Which is the incorrect statement?

- 1) Bioavailability after oral administration is about 16% [0]
- 2) Inhibit eicosanoid synthesis [0]
- 3) Lower intraocular pressure [0]
- 4) Naloxone blocks the antinociceptive actions of cannabinoids [0]
- 5) 9-tetrahydrocannabinol is an active constituent of the resin [0]

Cannabinoids are derived from the resin of Cannabis sativa and 9-tetrahydrocannabinol(9-THC) is its most important pharmacologically active constituent. Its bioavailability after oral ingestion is about 6%. Naloxone and other opioid receptor antagonists block the analgesic actions of cannabinoids. Synthetic cannabinoids reduce arachidonic acid-induced inflammation by inhibiting eicosanoid production.

4- In Down syndrome, which is the commonest congenital heart defect?

- 1) Atrial septal defect [0]
- 2) Atrioventricular septal defect [0]
- 3) Patent ductus arteriosus [0]
- 4) Tetralogy of Fallot [0]
- 5) Ventricular septal defect [0]

50% of Down syndrome births have congenital heart disease. Defects in order of decreasing frequency are: B, E, C, D and A.

5- A 45-year-old solicitor had an onset of severe, crushing, substernal chest pain while attending a football match. He collapsed on his way to the car. Bystander Cardiorespiratory Resuscitation was begun immediately and continued until arrival in Casualty where an endotracheal tube was inserted and ventilation was maintained on 100% oxygen.

Investigations revealed:

pH 7.13
PaO₂ 560 mmHg
PaCO₂ 18 mmHg
Bicarbonate 5.8
SaO₂ 98%

Based on these laboratory values, which of the following statements best describes his current pathophysiology?

- 1) He is demonstrating a primary respiratory alkalosis [0]
- 2) He probably developed a large right to left intracardiac shunt [0]
- 3) His anion gap is probably normal [0]
- 4) His oxyhemoglobin curve is shifted to the left [0]
- 5) His pulmonary artery pressure is probably elevated [0]

This young patient with severe central chest pain has probably arrested due to myocardial infarction and arrhythmia. His gases reveal high PO₂ following 100% O₂ but severe acidosis due to the arrest and lactic acidosis thus anion gap would be high. He does not have a primary ventilatory failure as his PO₂ is high. There is no left to right shunting and high pulmonary pressures would be expected after this arrest scenario.

Cardiology

1- A previously well 27-year-old woman presents with a history of transient ischaemic attack affecting her right side and speech. She had returned to the United Kingdom from a holiday in New Zealand two days previously. On examination there was nothing abnormal to find. An ECG, chest X-ray, CT brain scan and routine haematology and biochemistry were all normal. What is the most likely underlying abnormality?

- 1) atrial myxoma [0]
- 2) carotid artery stenosis [0]
- 3) embolus from paroxysmal atrial fibrillation [0]
- 4) patent foramen ovale [0]
- 5) subarachnoid haemorrhage [0]

This is a typical cause of stroke in a young person due to prolonged immobility. Deep vein thrombosis with patent foramen ovale will cause paradoxical embolism and stroke.

2- A 51-year-old woman has had several syncopal episodes over the past year. Each episode is characterized by sudden but brief loss of consciousness. She has no chest pain. She has no ankle edema. On brain MRI there is a 1.5 cm cystic area in the left parietal cortex. A chest X-ray shows no cardiac enlargement, and her lung fields are normal. Her serum total cholesterol is 6.5 mmol/L. Which of the following cardiac lesions is she most likely to have?

- 1) Cardiac amyloidosis [0]
- 2) Ischemic cardiomyopathy [0]
- 3) Left atrial myxoma [0]
- 4) Mitral valve prolapse [0]
- 5) Tuberculous pericarditis [0]

Atrial myxomas are more often on the left. Though benign, they can occlude the mitral valve and produce sudden loss of cardiac output. They may embolize small portions of themselves or thrombus formed over their surface.

3- A 66-year-old man has developed chronic renal failure with a serum urea of 60 mmol/L and creatinine of 650 micromol/L. Auscultation of the chest reveals a friction rub over the cardiac apex. He is most likely to have a pericarditis that is termed?

- 1) Constrictive [0]
- 2) Fibrinous [0]
- 3) Hemorrhagic [0]
- 4) Purulent [0]
- 5) Serous [0]

The uraemia leads to exudation of fibrin onto the epicardial and pericardial surfaces. Haemorrhagic pericarditis is more typical of tuberculosis or metastatic tumour. Serous pericarditis is more typical of collagen vascular diseases.

4- Which ONE of the following is a contraindication to thrombolysis?

- 1) age over 75 years [0]

- 2) the presence of atrial fibrillation [0]
- 3) asthma [0]
- 4) pregnancy [0]
- 5) background diabetic retinopathy [0]

Those over 75 years benefit as much or more than younger MI patients from thrombolysis. Proliferative diabetic retinopathy is a relative contraindication. Important contraindications to thrombolysis include pregnancy, bleeding (gut, menstrual), recent stroke or surgery, uncontrolled severe hypertension, GI malignancy and prolonged CPR (more than half an hour).

5- Which of the following anti-microbials is associated with prolongation of the QT interval?

- 1) Co-amoxiclav [0]
- 2) Gentamicin [0]
- 3) Cefuroxime [0]
- 4) Erythromycin [0]
- 5) Isoniazid [0]

The macrolides are associated with a prolongation of the QT interval. Other antimicrobials associated with prolonged QT include quinine, levofloxacin.

6- A 60-year-old man presents with an inferior MI and receives thrombolysis. 4 hours following initial presentation he becomes acutely breathless. His ECG demonstrates sinus tachycardia (rate 108bpm) with T wave inversion inferiorly. His ST segments are normal. On examination his JVP is elevated at 5 cm. Chest was clear to auscultation. Following 80 mg of Frusemide he deteriorates. His BP is now 80/60 and his urine output over the last 2 hours is 5 mls. What is the best investigative measure?

- 1) Arterial Blood Gases [0]
- 2) Central Venous Pressure Monitoring [0]
- 3) Chest X-Ray [0]
- 4) Echocardiography [0]
- 5) Pulmonary Capillary Wedge Pressure Monitoring [0]

The scenario is that of a right ventricular MI. The treatment in this situation is fluid to increase LVEDP and not frusemide, which worsens the situation. The best way to determine if adequate fluid is being given is using a Swan Ganz catheter to monitor PCWP (a surrogate for Left Atrial pressure). While CVP monitoring is also helpful, CVP is increased in LV failure due to infarct as well so would not help to monitor treatment. Echocardiography would show a small volume LV with a dilated RV.

7- Which of the following is a recognised feature of massive pulmonary embolism?

- 1) reduced plasma lactate levels [0]
- 2) an increase in serum troponin levels [0]
- 3) an arterial pH less than 7.2 [0]
- 4) blood gases show increased pCO₂ on air [0]
- 5) normal D-dimer levels [0]

Cardiac troponins are reliable markers of myocardial injury that are being used increasingly in patients presenting with undifferentiated chest pain or dyspnea to diagnose an acute coronary syndrome. If elevated cardiac troponin levels also occur in patients with pulmonary embolism because of right ventricular dilation and myocardial injury, such patients could be misdiagnosed. We performed a prospective cohort study to determine the prevalence of elevated cardiac troponin I (cTnI) levels in patients with submassive pulmonary embolism. **METHODS:** Consecutive patients with objectively confirmed submassive pulmonary embolism and no previous history of ischemic heart disease, other cardiac disease, or renal insufficiency were included. Creatine kinase and cTnI levels were measured within 24 hours of clinical presentation on 2 occasions 8 to 12 hours apart. **RESULTS:** Of 24 patients with submassive pulmonary embolism, 5 (20.8%) had elevated cTnI levels of 0.4 microg/L or higher (95% confidence interval, 7.1-42.2%). One of these patients had a cTnI level higher than 2.3 microg/L that was suggestive of myocardial infarction. **CONCLUSION:** Pulmonary embolism should be considered in the differential diagnosis of patients presenting with undifferentiated chest pain or dyspnea and an elevated cardiac troponin level. (Arch Intern Med, 162(1): 79-81 2002)

Hypoxemia and hypocapnoea are common after major pulmonary embolism and may also be found after more minor events. Absence of these phenomena, on the other hand, by no means excludes embolism and their presence is non-specific. In suspected minor embolism this investigation is, at best, only of marginal value. The precise stimulus to hyperventilation is unknown and there is also difficulty in understanding the reasons for hypoxaemia when it is present.

8- A 60-year-old man has worsening congestive heart failure with increasing pulmonary oedema. His blood pressure is normal. He has been healthy all his life with no major illnesses. A serum glucose is 5.6 mmol/L. His total serum cholesterol is 4.8 mmol/L. The serum creatine kinase is not elevated. The most likely explanation for these findings is?

- 1) Alcoholic cardiomyopathy [0]
- 2) Aortic dissection [0]
- 3) Calcified bicuspid aortic valve [0]
- 4) Mitral valve annulus calcification [0]
- 5) Tricuspid valve endocarditis [0]

The clinical signs point to a left-sided heart failure which would discount alcoholic cardiomyopathy as it would be biventricular and tricuspid valve endocarditis which would be right sided. There are not symptoms and the history is not sudden to suggest aortic dissection. Mitral valve calcification is an incidental finding at ECHO. This leaves a calcified bicuspid aortic valve leading to aortic stenosis as the likely explanation.

9- During auscultation of the heart you discover a wide fixed splitting of the second heart sound. In which of the following conditions does this occur?

- 1) an uncomplicated ASD [0]
- 2) Fallot's tetralogy [0]

- 3) aortic stenosis [0]
- 4) Right Bundle Branch Block [0]
- 5) constrictive pericarditis [0]

There is a single sound in Fallot's because of an absent P2. Aortic stenosis leads to reversed splitting (also seen with LBBB and ventricular pacemaker). In RBBB there is wide splitting of S2 but it is not fixed.

Aortic stenosis-signs

slow rising small volume pulse
low BP narrow pulse pressure
exaggerated a wave in JVP
palpable left atrial beat (double apex)
sustained apex beat
quiet 2nd heart sound
4th heart sound
harsh murmur radiating to carotids
often a short regurgitant murmur
calcified valve on CXR
LVH on ECG
bundle branch block

Fallot's tetralogy-symptoms+signs

Dyspnoea
Syncope
CYANOSIS, squatting
ABSENT P2
PULMONARY EJECTION MURMUR
RIGHT VENTRICULAR HYPERTROPHY
Overriding aorta, pulmonary stenosis vsd, inc Hb, wooden shoe heart contour

10- A 62 year old man has experienced substernal chest pain upon exertion with increasing frequency over the past 1 year. An electrocardiogram shows T wave inversion in the anterolateral leads at rest. He has a total serum cholesterol of 7.0 mmol/l. On angiography, he has an 85% narrowing of the left anterior descending artery.

Which of the following events is most likely to occur in this patient?

- 1) A systemic artery embolus from thrombosis in a peripheral vein. [0]
- 2) A systemic artery embolus from a left atrial mural thrombus. [0]
- 3) Pulmonary embolism from a left ventricular mural thrombus [0]
- 4) A systemic artery embolus from a left ventricular mural thrombus. [0]
- 5) Pulmonary embolism from thrombosis in a peripheral vein. [0]

The suggestion here is that this man has coronary artery disease with an impending myocardial infarction. Infarction of the LAD would cause necrosis of the left

ventricle. Thrombus may form on an area of dyskinetic ventricle. Therefore he is most at risk of embolus of thrombus from the LV.

11- A 17 year old girl was found collapsed and drowsy. Her 12-lead ECG showed a sinus tachycardia of 120 beats per minute with a corrected QT interval of 500 ms (normal <470). Which of the following is the most likely cause of her presentation?

- 1) Amphetamine [0]
- 2) Diphenhydramine [100]
- 3) Glue sniffing [0]
- 4) Methadone [0]
- 5) Methanol [0]

Many drugs can cause a prolonged QT interval. more
<http://www.ihc.com/xp/ihc/lds/research/specialtopics/longqt.xml>

12- A randomised double-blind placebo controlled study of a cholesterol-lowering drug for the primary prevention of coronary heart disease was conducted. It had a five-year follow up period.

The results showed an absolute risk of myocardial infarction in the group-receiving placebo during was 10 per cent. The relative risk of those given the cholesterol lowering medication was 0.8

What number of patients will need to be treated with the drug for five years to prevent one myocardial infarction?

- 1) 20 [0]
- 2) 40 [0]
- 3) 50 [0]
- 4) 80 [0]
- 5) 100 [0]

This is a question concerning Number Needed to Treat (NNT). The calculation involves a little arithmetic. The absolute risk of MI is 10%. The relative risk in the treated group is 0.8. We need the absolute risk in the treated group which is $0.8 \times 10\% = 8\%$. The difference between the two is the 'absolute risk reduction' which should always be the preferred headline figure for presenting results. In this case it is 2%. To get the number needed to treat to prevent MI we simply divide this into 100 which gives us 50. We need to treat 50 patients with the drug to prevent 1 MI.

13- Which ONE of the following is true regarding acute pulmonary embolism?

- 1) a normal ECG excludes the diagnosis [0]
- 2) embolectomy is more effective than thrombolysis in improving survival [0]
- 3) Heparin is as effective as thrombolytic therapy [0]
- 4) the presence of hypoxaemia is an indication for thrombolysis [0]
- 5) thrombolysis administered through a peripheral vein is as effective as through a pulmonary artery catheter [0]

Embolectomies are rarely done nowadays due to the excellent results with thrombolysis. Thrombolytic therapy is reserved for those with severely compromised

circulation (equally effective through peripheral vein or via catheter in pulmonary artery). Heparin reduces risk of further embolism (anticoagulant) and reduces pulmonary vasoconstriction.

14- A 70-year-old woman has a history of dyspnoea and palpitations for six months. An ECG at that time showed atrial fibrillation. She was given digoxin, diuretics and aspirin. She now presents with two short-lived episodes of altered sensation in the left face, left arm and leg. There is poor coordination of the left hand. ECHO was normal as was a CT head scan.

What is the most appropriate next step in management?

- 1) anticoagulation [0]
- 2) carotid endarterectomy [0]
- 3) clopidogrel [0]
- 4) corticosteroid treatment [0]
- 5) no action [0]

This patient is having symptoms of transient ischaemic attacks most likely due to a cardiac source of emboli. A normal ECHO or CT head does not rule out thrombo-embolic events. There is an increased risk of strokes in patients with atrial fibrillation and hence with the given symptoms formal anticoagulation with warfarin should be considered.

15- A 21 year old man with Hypertrophic Cardiomyopathy presents in clinic with dizzy spells but has not had any syncopal episodes. Which of the following, if present, would indicate an increased risk of sudden cardiac death?

- 1) Asymmetric septal hypertrophy with maximum wall thickness of 2.1 cm [0]
- 2) Blood Pressure drop of 20mmHg during peak exercise tolerance testing [0]
- 3) Left Ventricular Outflow Tract Gradient of 80 mmHg [0]
- 4) Systolic Anterior Movement of the mitral valve on echocardiography [0]
- 5) Worsening exertional angina [0]

Patients with Hypertrophic Cardiomyopathy (HCM) are at increased risk of sudden cardiac death due to VF/VT. The five poor prognostic markers which are predictive of sudden cardiac death are:

Syncope

Family History of HCM and sudden cardiac death

Maximum Left Ventricular Wall Thickness >3cm

BP drop during peak exercise on stress testing

Documented runs of Non-Sustained VT on 24 hour tape.

LVOT obstruction causes symptoms and can lead to deterioration of LV function but does not predict sudden cardiac death. Asymmetric Septal Hypertrophy is a feature of HCM, in order to assess the risk for sudden cardiac death a detailed echocardiogram with measurements of the maximum left ventricular wall thickness is required.

Systolic anterior movement of the mitral valve is often seen on echocardiogram and is thought to be the mechanism behind the left ventricular outflow tract obstruction.

16- Whilst attending the cardiology clinic, the staff nurse measures the blood pressure of a 61-year-old man, and finds that it is 183/100 mmHg sitting and 190/105 standing.

He has a heart rate of 81/minute, with an irregularly irregular rhythm. On auscultation of the heart, there are no murmurs, but he has bibasilar crackles on chest examination. Which of the following pathological findings is most likely to be present?

- 1) Left ventricular hypertrophy [100]
- 2) Left atrial myxoma [0]
- 3) Occlusive coronary atherosclerosis [0]
- 4) Cor pulmonale [0]
- 5) Mitral regurgitation [0]

This gentleman is likely to have a hypertensive cardiomyopathy with a left ventricle hypertrophy. The LVH is secondary to increased afterload, as a result of chronic hypertension. The AF, suggested by an irregularly irregular pulse is an indicator of diastolic dysfunction and poor ventricular filling. This in turn the pulmonary congestion, as evidenced by the bibasal crackles. There is no murmur or plop to suggest atrial myxoma.

17- A 24-year-old woman develops infective endocarditis involving the aortic valve. She receives a porcine bioprosthesis because of her desire to have children and not to take anticoagulant medication. After ten years, she must have this prosthetic valve replaced. Which of the following pathologic findings in the bioprosthesis has most likely led to the need for replacement?

- 1) Calcification with stenosis [0]
- 2) Dehiscence [0]
- 3) Infective endocarditis [0]
- 4) Strut failure [0]
- 5) Thrombosis [0]

The bioprosthesis has the advantage of not requiring anticoagulation, but it does not wear well with time, and typically must be replaced within 5 to 10 years.

18- A randomised, double-blind, placebo controlled trial of a cholesterol lowering drug in the primary prevention of coronary heart disease is reported. 1000 subjects are treated with the active drug, and 1000 are given placebo. They are followed up over a five year period and 100 individuals in the placebo group and 80 in the treatment group suffer a myocardial infarction.

What is the annual percentage risk of myocardial infarction in the group treated with placebo?

- 1) 0.5% [0]
- 2) 2% [0]
- 3) 5% [0]
- 4) 8% [0]
- 5) 10% [0]

Why this question is in the MRCP exam is anyone's guess! This is more of a mathematics exam.

In the 5 years 100 patients in the placebo group develop an MI. Assuming this is spread evenly across the years this means that 20 patients (out of 1000) suffer an MI

each year. The annual risk is therefore $20/1000 = 0.02$ which, expressed as a percentage is 2.

19- A 25-year-old previously healthy woman has worsening fatigue with dyspnoea, palpitations, and fever over the past one week. Her vital signs on admission to the hospital show Temperature 38.9°C Respiratory rate 30/min Pulse 105 bpm and BP 95/65 mmHg. Her heart rate is irregular. An ECG shows diffuse ST-T segment changes. A Chest X-ray shows mild cardiomegaly. An echocardiogram shows slight mitral and tricuspid regurgitation but no valvular vegetations. Her troponin I is 12 ng/mL. She recovers over the next two weeks with no apparent sequelae. Which of the following laboratory test findings best explains the underlying etiology for these events?

- 1) ANCA titer of 1:80 [0]
- 2) Anti-streptolysin O titer of 1:512 [0]
- 3) Blood culture positive for Streptococcus, viridans group [0]
- 4) Coxsackie B serologic titer of 1:160 [0]
- 5) Total serum cholesterol of 9.6 mmol/l [0]

She has findings that suggest myocarditis, which can have features of cardiomyopathy. One of the most likely organisms is Coxsackie B virus.

20- A 74-year-old man presented with acute pain, pallor and absent pulses in his right leg. Investigations revealed an embolus in his femoral artery. What is the most likely source of this embolus?

- 1) marantic endocarditis [0]
- 2) paradoxical emboli [0]
- 3) rheumatic endocardial vegetations [0]
- 4) right ventricular thrombi [0]
- 5) thrombi from an atheromatous aorta [0]

Ulceration of an atheromatous plaque of the abdominal aorta is the most common source of emboli in this situation. Right ventricular thrombi would embolise to the lung. The others are possible but less likely causes.

21- Which of the following concerning congenital heart disease is correct?

- 1) ASD is the commonest malformation at birth [0]
- 2) congenital complete heart block is usually associated with Anti-Ro antibodies in the mother [0]
- 3) Ebstein's anomaly is associated with maternal exposure to lithium carbonate [0]
- 4) Hypoplastic left heart syndrome is characterised by a large, dilated left ventricle [0]
- 5) Osteogenesis imperfecta is associated with aortic stenosis [0]

A VSD is the commonest at 30%, ASD is 10%. Aortic regurgitation may be a feature of Osteogenesis imperfecta. Ebstein's anomaly is associated with maternal LiCO₃ use if exposed in the first trimester. In the vast majority of cases of neonates with

complete heart block the cause is unknown but in the minority it may be caused by autoimmune disease, particularly Anti-Ro antibodies, in the mother. LV Hypoplasia occurs when the left sided chambers fail to develop and blood enters the systemic circulation from the right ventricle via the pulmonary artery and a patent ductus arteriosus.

22- Which of the following regarding the anatomy of the heart is true?

- 1) The aortic valve is tricuspid. [0]
- 2) The ascending aorta is entirely outside the pericardial sac. [0]
- 3) The left atrial appendage is identified readily by transthoracic echocardiography. [0]
- 4) The pulmonary trunk lies anterior to the ascending aorta. [0]
- 5) The right atrium is posterior to the left atrium. [0]

The pulmonary trunk lies posterior to the aorta. The ascending aorta lies completely within the pericardium as does the pulmonary trunk. The left atrium is the most posterior chamber of the heart, the right atrium is just anterior and to the right of the left atrium. The left atrial appendage is not readily seen on transthoracic echocardiography and requires transoesophageal echocardiography.

23- A patient presents with atrial fibrillation and later they revert to sinus rhythm. Under which of the following circumstances is the patient more likely to remain in sinus rhythm?

- 1) age > 75 years old [0]
- 2) been commenced on warfarin [0]
- 3) left atrium size > 6 cm on ECHO [0]
- 4) short history of AF [0]
- 5) ventricular rate on presentation of 130 bpm [0]

The patient with very recent onset of atrial fibrillation is more likely to stay in sinus rhythm.

Atrial fibrillation in older patients is more likely to be associated with structural heart disease. Anticoagulation should have no effect on the risk of paroxysmal atrial fibrillation. An enlarged left atrium is unlikely to remain in sinus rhythm. Those presenting with a relatively slow ventricular rate and, especially if they are not on betablockers, Calcium antagonists or digoxin, are likely to have chronic atrial fibrillation.

24- A 68-year-old man has been very ill for months following the onset of chronic liver disease with hepatitis C infection. He experiences a sudden loss of consciousness and then exhibits paraplegia on the right. A cerebral angiogram reveals lack of perfusion in the left middle cerebral artery distribution. The most likely cardiac lesion to be associated with this finding is?

- 1) Acute rheumatic fever [0]
- 2) Left atrial myxoma [0]
- 3) Libman-Sacks endocarditis [0]
- 4) Non-bacterial thrombotic endocarditis [0]
- 5) Paradoxical thromboembolus [0]

Marantic endocarditis has platelet-fibrin thrombi that are prone to embolize. This form of non-infective endocarditis can be seen in persons who are very debilitated or who have a hypercoagulable state.

25- A 65 year old man presents with severe central crushing chest pain. ECG shows evidence of an inferior myocardial infarction. He receives TPA, Heparin and Aspirin. Four hours after initial presentation, he starts feeling dizzy and breathless. His pulse is 40 bpm regular, BP 80/50. Heart sounds are soft and chest clear to auscultation. ECG shows 2:1 AV block with T wave inversion inferiorly. IV atropine was administered but had no effect. What is the next most important treatment?

- 1) IV Dopamine. [0]
- 2) IV Isoprenaline. [0]
- 3) Insert a permanent pacemaker. [0]
- 4) Insert a temporary pacemaker. [0]
- 5) Monitor his progress. [0]

This patient has had an inferior MI which is commonly associated with conduction abnormalities. He now develops heart block which leaves him bradycardic, symptomatic and with a low BP. Isoprenaline is contraindicated in acute MI due to its positive inotropic effects and arrhythmogenic potential. A temporary wire would deal with the situation until the inferior MI has fully resolved. He is unlikely to need a Permanent Pacemaker.

26- A 70-year-old male is referred by his GP for management of recently diagnosed congestive heart failure. The patient has a history of poorly controlled hypertension. Over the last three months he has been aware of deteriorating shortness of breath, fatigue, and orthopnea. Over the last month he had been commenced on Digoxin (62.5 micrograms daily), Frusemide (80 mg daily), and amiloride 10 mg. On examination he has a pulse of 96 bpm regular, a blood pressure of 132/88 mmHg. His JVP was not raised, he had some scattered bibasal crackles on auscultation with a displaced apex beat in the anterior axillary line, 6th intercostal space. Auscultation of the heart revealed no murmurs and he had peripheral oedema to the mid tibia.

Investigations showed: electrolytes normal
serum urea concentration 17 mmol/l (NR 2-8 mmol/l)
creatinine 175 micromol/l (NR 55-110)
Serum digoxin 0.7 ng/mL {therapeutic: 1.0-2.0}

One month previously his urea had been 11 mmol/l and creatinine 110 micromol/l. An ECG reveals left ventricular hypertrophy and Chest X-ray shows cardiomegaly and calcified aorta.

What is the most appropriate next step in management?

- 1) Add an ACE inhibitor to the current regimen [100]
- 2) Add atenolol at a dose of 25mg daily [0]
- 3) Increase digoxin to 0.25 mg daily [0]
- 4) Increase frusemide to 80 mg twice daily [0]

5) Maintain on current therapy. [0]

This patient would be classified as probably NYHA grade III heart failure (dyspnoeic at rest). With the persisting symptoms despite 80mg of frusemide, guidelines would initially suggest the addition of an ACE inhibitor. Although there has been a mild decline in his U+Es since the introduction of therapy this would not be a contra-indication to the use of ACEis. There is no evidence that increasing a dose of digoxin above 62.5 micrograms in a patient in sinus rhythm would have any added benefit. Although beta-blockers would be of further benefit in this patient, it is important first to establish him on ACEi and then introduce beta-blockers like carvedilol, metoprolol or bisoprolol in a small dose and gradually increase.

27- A 14-year-old boy presents with hypertension. Which of the following statements concerning hypertension in the young is true?

- 1) Sodium nitroprusside is useful for the long-term treatment of severe cases. [0]
- 2) Headache is the usual presenting feature. [0]
- 3) It is defined as systolic blood pressure above the 99th centile for age. [0]
- 4) Abnormalities are frequently seen on DMSA scan. [100]
- 5) Aortic coarctation is the commonest secondary cause. [0]

D Sodium nitroprusside is useful only in the short term, as cyanide levels accumulate with time. Hypertension is usually diagnosed incidentally, and is defined as systolic blood pressure >95th centile for age. Secondary causes are usually due to renal abnormalities, with reflux associated scarring being the commonest renal disease. This will cause abnormalities on DMSA scan. Coarctation of the aorta is the commonest non-renal cause, with pheochromocytoma/neuroblastoma, congenital adrenal hyperplasia, Cushing Syndrome and steroid therapy being rarer causes.

28- A 23 year old male presents with a deep vein thrombosis. He has no past medical history but his mother has suffered from deep vein thromboses. Which of the following is likely to be found on haematological assessment?

- 1) Factor V Leiden mutation [0]
- 2) Protein S deficiency [0]
- 3) Protein C deficiency [0]
- 4) Antithrombin deficiency [100]
- 5) Lupus anticoagulant [0]

Antithrombin deficiency is an autosomal dominant condition present in 0.02 - 1.1% of the population and is found in 4% of subjects that present with a thromboembolism. Factor V Leiden is a possibility although seems less likely as the inheritance pattern seems more likely to be AD. Similarly as the son had a DVT this would be far less likely with FVLeiden than ATIII as thrombosis is more often precipitated in females on the OCP. See (Simioni P, Sanson BJ, Prandoni P, et al. Thromb Haemost 1999 Feb;81(2):198-202) who show that "The annual incidences of total and spontaneous venous thromboembolic events in carriers of AT, PC or PS defects (n=181) were 1.01% and 0.40%, respectively, as compared to 0.10% and 0.04% in non-carriers, respectively (relative risks both 10.6). In carriers of Factor V Leiden (n= 224), the

annual incidences of total and spontaneous venous thromboembolism were 0.28% and 0.11%, respectively, as compared to 0.09% and 0.04% in non-carriers, respectively (relative risks 2.8 and 2.5)."

29- In a normal heart, the oxygen saturation of a sample of blood taken from a catheter in the pulmonary capillary wedge position should be equal to a sample from which of the following?

- 1) coronary sinus [0]
- 2) femoral artery [100]
- 3) pulmonary artery [0]
- 4) right atrium [0]
- 5) right ventricle [0]

Pulmonary capillary wedge normal values reflect pressures and saturations of the left side of the heart. Consequently wedge pressures are between 6-12 mmHg and the saturations of blood taken from the wedged source reflects blood in the pulmonary vein and hence high sats similar to that seen in the femoral artery.

30 -A 60-year-old man with a past history of controlled hypertension presents with acute onset weakness of his left arm, that resolved over 12 hours. He had suffered two similar episodes over the last three months. Examination reveals a blood pressure of 132/82 mmHg and he is in atrial fibrillation with a ventricular rate of 85 per minute. CT brain scan is normal.

What is the most appropriate management

- 1) amiodarone [0]
- 2) aspirin [0]
- 3) digoxin [0]
- 4) dipyridamole [0]
- 5) warfarin [100]

This patient has had three transient ischaemic attacks due to atrial fibrillation. The most appropriate therapeutic strategy for this patient would be warfarin. Studies reveal that warfarin would be therapeutically superior than aspirin in such a patient's case.

31- In a patient presenting with aortic stenosis, which of the following findings would be most helpful in establishing a diagnosis of congenital bicuspid valve as the etiology?

- 1) age [0]
 - 2) calcified leaflets [0]
 - 3) commissural fusion on ECHO [0]
 - 4) negative history for rheumatic fever [0]
 - 5) systolic ejection click [100]
-

32- A 55-year-old woman was found to have ++ glycosuria and had a maternal history of Type II diabetes mellitus. She was a smoker of 20 cigarettes per day. Examination reveals no specific abnormalities apart from a BMI of 30. Blood pressure was 132/88 mmHg. Investigations reveal:

serum creatinine 80 μ mol/L (60 – 110)
plasma glucose (fasting) 11.3 mmol/L (3.0 – 6.0)
total serum cholesterol 5.5 mmol/L (<5.2)
HDL cholesterol 1.4 mmol/L (>1.55)

What is most likely to improve her life expectancy?

- 1) Metformin 500 mg bd [0]
- 2) Ramipril 10 mg daily [0]
- 3) Simvastatin 10 mg daily [0]
- 4) Stopping smoking [100]
- 5) Weight loss to achieve a BMI of 25 [0]

She is diabetic and obese as defined by her BMI of 30. She is most prone to risk of cardiovascular disease and the best thing that she could do to improve mortality would be to quit smoking.

Stopping smoking is the first priority ... even if it causes further weight gain. Drugs such as 'reductil' can be used to help patients limit weight gain when stopping smoking.

Smoking is associated with a cardiovascular risk of 6x in women and 3x in men. Stopping smoking (after an MI) reduces the risk of recurrent MI by 50%.

(Njolstad I, Arnesen E, Larsen PG, Smoking, serum lipids blood pressure and sex difference in myocardial infarction. Circulation 1996; 93:450

Presco E, Hipp M, Schnohr P, et al. Smoking and the risk of myocardial infarction in women and men. BMJ, 1998; 316: 1043)

33- Which of the following concerning the use of intravenous bicarbonate in cardiorespiratory arrest is correct?

- 1) exacerbates intracellular acidosis [100]
- 2) has a positive inotropic effect on ischaemic myocardium [0]
- 3) improves oxygen release to the tissues [0]
- 4) increases cerebral blood flow [0]
- 5) reduces pre-existent hyperkalemia [0]

Has negative inotropic effect, reducing cerebral blood flow, shifts oxygen dissociation curve to the left inhibiting oxygen release to tissues.

34- Primary prevention trials for the treatment of hypercholesterolaemia reveal a reduction in all cause mortality following treatment with which of the following?

- 1) Fibrates [0]
- 2) Fish Oils [0]
- 3) Nicotinic acid [0]
- 4) Resins [0]
- 5) Statins [100]

Primary prevention refers to the prevention of cardiovascular disease in subjects without pre-existent IHD. Although many lipid lowering agents have demonstrated reductions in cardiovascular mortality, the question refers to all cause mortality. WOSCOPS (pravastatin) and AFCAPS-TexCAPS (lovastatin) demonstrated reductions in overall mortality not just cardiovascular mortality following treatment with statins. None of the other agents are proven to reduce all cause mortality in primary prevention. Fibrates are however well proven in secondary prevention trials (BECAIT, VA-HIT).

35- A 30-year-old man presents with a history of transient loss of consciousness and palpitations. His ECG shows ventricular tachycardia.

Which of the following treatments should be avoided?

- 1) adenosine [0]
- 2) amiodarone [0]
- 3) DC cardioversion [0]
- 4) flecainide [0]
- 5) verapamil [100]

If there were 'killer' questions (questions that if a candidate got wrong they would certainly fail the exam) in the MRCP exam then this would be one of them. Verapamil should be avoided in cases of VT because it can cause a catastrophic fall in blood pressure. Adenosine is useful diagnostically when the diagnosis of regular wide complex tachycardia is in doubt. Amiodarone is a useful antiarrhythmic agent though its use acutely is limited by its irritant nature on veins. DC Cardioversion is probably the treatment of choice in this case. Flecainide is a good antiarrhythmic and would be indicated in patients without LV failure (it is associated with an increased risk of death in such cases). Flecainide is widely used for atrial fibrillation.

36- A 56 year old male with left ventricular systolic dysfunction was dyspnoeic on climbing stairs but not at rest. The patient was commenced on ramipril and frusemide. Which one of the following drugs would improve the patient's prognosis?

- 1) Amiodarone [0]
 - 2) Amlodipine [0]
 - 3) Bisoprolol [100]
 - 4) Digoxin [0]
 - 5) Nitrate therapy [0]
-

This patient has NYHA stage II heart failure. Studies such as CIBIS-II and MERIT-HF reveal that beta-blockers significantly reduce morbidity and mortality in heart failure.

37- A 44-year-old man has had no major medical problems throughout his life, except for arthritis pain involving all extremities for the past couple of years. He has had worsening orthopnoea and ankle oedema in the past six months. He is afebrile. There is no chest pain. A chest X-ray shows cardiomegaly with both enlarged left and right heart borders, along with pulmonary oedema. Laboratory test findings include sodium 139 mmol/L, potassium 4.3 mmol/L, urea 7 mmol/L creatinine 95 µmol/L, and glucose 8.6 mmol/L. Which of the following additional laboratory test findings is he most likely to have?

- 1) Anti-centromere antibody titer of 1:320 [0]
- 2) Erythrocyte sedimentation rate of 79 mm/Hr [0]
- 3) Haemoglobin of 10.7 g/dL with MCV of 72 fL [0]
- 4) Serum ferritin of 3400 pmol/L [100]
- 5) Spherocytes in his peripheral blood smear [0]

He has findings of a cardiomyopathy with right and left heart failure. Hereditary haemochromatosis (HHC) is suspected with a serum ferritin > 1000 and confirmed by genetic testing. It is characterised by diabetes, CCF, pseudogout and slate-grey skin. "HHC is an autosomal recessive condition and in 90% of cases in the United Kingdom (UK) the condition is owing to homozygosity for the C282Y mutation in the HFE gene.² A second mutation in the HFE gene, H63D, can cause the disease when in the presence of a single C282Y mutation (the so-called 'compound heterozygote' state). These mutations are common in people of Northern European origin with a carrier frequency of the C282Y mutation of one in 10–17, in the UK, suggesting a prevalence of people homozygous for the C282Y mutation of between one in 100 and one in 280.³ If HHC becomes symptomatic by mid-life, a general practitioner (GP) with a list size of 2000 patients should have approximately four cases. In our experience most GPs claim to have never seen a case. Herein lies the conundrum: is HHC far more common than is currently recorded in clinical records and death registers because it is not being diagnosed, or does significant disease not develop in a large proportion of C282Y homozygotes and compound heterozygotes?" More ... <http://www.rcgp.org.uk/rcgp/journal/issues/may01/Editor1.asp>

38- Which of the following is a recognised feature of abetalipoproteinaemia?

- 1) a high serum cholesterol [0]
- 2) palmar xanthomas [0]
- 3) advanced atherosclerotic vascular disease [0]
- 4) abnormal red blood cell morphology [100]
- 5) severe mental retardation [0]

Acanthocytes are seen in abetalipoproteinaemia.

Retinitis pigmentosa is seen in abetalipoproteinaemia. Mental retardation is not present but motor abnormalities and neurodegenerative are seen.

39- Which of the following infections is least likely to cause myocarditis?

- 1) Coxsackie virus [0]
- 2) Diphtheria [0]
- 3) Chagas Disease [0]
- 4) Syphilis [100]
- 5) Toxoplasmosis [0]

Quaternary syphilis involves the cardiovascular system commonly in form of ascending aortic aneurysm and aortic regurgitation. Diphtheria, coxsackie virus, Chagas disease and toxoplasmosis are all associated with myocarditis.

40- A 68 year old woman was admitted to hospital with evidence of biventricular cardiac failure. On examination her pulse was 100 beats per minute (sinus rhythm), and her blood pressure was 140/60 mmHg. She had haemorrhages in both fundi. Her condition improved after intravenous diuretics.

Investigations revealed:

haemoglobin 5.6 g/dl (11.5 – 16.5)
 haematocrit 0.19 (0.36 – 0.47)
 MCV 118 fl (80 – 96)
 MCH 33.0 pg (28 – 32)
 WCC $3.4 \times 10^9/L$ (4 – 11)
 platelet count $95 \times 10^9/L$ (150 – 400)

What is the next most appropriate step in management?

- 1) blood transfusion [0]
- 2) bone marrow aspiration [100]
- 3) intramuscular vitamin B12 alone [0]
- 4) intramuscular vitamin B12 and oral folic acid together [0]
- 5) oral folic acid alone [0]

The clinical picture represents severe megaloblastic anaemia with cardiac failure. The investigations do not mention anything about B12 or Folate assays. So the next step would be to take blood for these assays and a bone marrow aspiration to identify the cause for the anaemia and then to start large doses of intramuscular vitamin B12 and oral folic acid. (ref: OTM)

Giving oral folic acid without Vitamin B12 would be hazardous and could precipitate subacute combined degeneration of the spinal cord. Transfusion may also be hazardous in a patient with severe CCF

41- Which of the following compounds has a vasodilating effect?

- 1) Antidiuretic hormone [0]
- 2) Calcitonin [100]
- 3) Endothelin [0]
- 4) Renin [0]
- 5) Somatostatin [0]

ADH acts on the Vasopressor receptors to cause vasoconstriction. Endothelin is also a vasoconstrictor as is renin. Somatostatin is also recognised to produce vasoconstriction of the splanchnic system.

42- Which of the following may be responsible for a hypokalaemic hypertension

- 1) Non-classical congenital adrenal hyperplasia [0]
- 2) Barter's syndrome [0]
- 3) Diabetic nephropathy [0]
- 4) Liddle's syndrome [100]
- 5) Type IV renal tubular acidosis [0]

Liddle's syndrome is typically associated with hypokalaemic hypertension and low renin and aldosterone concentrations - the so called pseudo-hyperaldosteronism. Barter's syndrome is associated with hypokalaemia though hypertension is not a feature. In type IV RTA, there is a hyporeninaemic hypoaldosteronism, which may also be produced with diabetic nephropathy. Hence hyperkalaemia is more typical.

43- A 52 year old sales representative is admitted with an inferior myocardial infarction. He receives thrombolysis and makes an uneventful recovery. He is discharged on atenolol, aspirin and atorvastatin. He enquires how long after his MI must he wait before he is able to drive?

- 1) One week [0]
- 2) Two weeks [0]
- 3) Four weeks [100]
- 4) Three months [0]
- 5) Six months [0]

The DVLA are quite clear on this issue. He must wait at least 4 weeks after his MI before he is able to drive. Similarly patients undergoing surgical revascularisation must also wait 4 weeks. If he was admitted with angina and underwent PTCA then he should wait one week.

44- A 35 year old woman presented with a history of intermittent light-headedness. Clinical examination and 12-lead ECG were normal.

Which of the following, if present on a 24 hour Holter ECG tracing, would be the most clinically important?

- 1) Atrial premature beats. [0]
- 2) Profound sleep-associated bradycardia. [0]
- 3) Supraventricular tachycardia. [100]
- 4) Transient Mobitz type 1 atrioventricular block. [0]
- 5) Ventricular premature beats. [0]

SVT commonly presents with palpitations but occasionally is associated with light-headedness. I really struggled with this question. I think it is what examiners refer to as a discriminatory question or basically one with no right answer. The problem is that intuitively SVT is the most common arrhythmia in this age group and can be

associated with light-headedness but as you know significant SVT commonly presents with palpitations; however, There is no mention of palpitations. The word "profound", preceding sleep-associated bradycardia is confusing; are they alluding to the fact that this woman has sick sinus and significant bradycardia has only manifested itself in her sleep? Is this more than just normal sleep associated bradycardia? I don't think that is the right answer though. Then there is D, Wenkebach is almost always asymptomatic but what is a 35 year old doing with Mobitz type I (it is commonly seen in athletes - Dean Jenkins)? We had a straw poll here at cardiology and decided in the end the right answer is C, which I agree with.

45- A 57-year-old man develops deep venous thrombosis during a hospitalization for prostatectomy. He exhibits decreased mental status with right hemiplegia, and a CT scan of the head suggests an acute cerebral infarction in the distribution of the left middle cerebral artery. A chest X-ray reveals cardiac enlargement and prominence of the main pulmonary arteries that suggests pulmonary hypertension. His serum troponin I is <0.4 ng/mL. Which of the following lesions is most likely to be present on echocardiography?

- 1) Coarctation of the aorta [0]
- 2) Dextrocardia [0]
- 3) Pulmonary stenosis [0]
- 4) Tetralogy of Fallot [0]
- 5) Ventricular septal defect [100]

This is 'paradoxical embolus' from right to left. This can only happen if there is a defect that allows passage from right-to left. This can happen across a patent foramen ovale. In this case, the pulmonary hypertension suggests that there may have been a shunt persistent for a long time - Eisenmenger complex. An atrial or a ventricular septal defect can provide the shunt.

46- A 60 year old man had a myocardial infarction 6 weeks ago. He is taking aspirin 75 mg/day and metoprolol 50mg 2/day. During a routine follow-up Exercise Test he has a 20 beat run of non-sustained VT. He achieved stage 4 of the Bruce protocol and 92 % of his target heart rate. The non-sustained VT occurred halfway through Stage 2. ST segments were normal during the study. What is the definitive investigation?

- 1) Coronary angiography. [0]
- 2) Echocardiogram. [0]
- 3) Electrophysiological study. [100]
- 4) Thallium exercise scan. [0]
- 5) 24 hour Holter monitor. [0]

Post MI VT is most commonly due to scar tissue. It may also be related to ischaemia but no signs of ischaemia were induced. The DEFINITIVE investigation would be EPS due to the fact that if this were scar related VT the site could be localised and even possibly ablated. If not then an ICD implantation may be warranted on MADIT criteria if LV dysfunction exists. Angio + Thallium may inform us of significant CAD but not offer us a solution to the problem. Echo would not be of much use apart from assessing LV function. There is no need for Holter as the VT has already been recorded.

The reference for MADIT is AmJCardiol 1997;79(suppl 6A):16-7. It was stopped early in 1996 by the steering committee due to extremely positive results in the ICD group. As a consequence it was only published in abstract form. However, MADIT-2 recently published in the NEJM (Ref: N Engl J Med 2002; 346:877-883, Mar 21, 2002) showed a 5.6% 20 month absolute survival benefit in patients with LV dysfunction (EF<30)post MI treated prophylactically with an ICD.

47- A 55-year-old woman has had worsening shortness of breath for several years. She now has to sleep sitting up on two pillows. She has difficulty swallowing. There is no history of chest pain. She is afebrile. Recently, she suffered a stroke with left hemiparesis. A chest X-ray reveals a near-normal left ventricular size with a prominent left atrial border. Which of the following conditions is most likely to account for these findings?

- 1) Aortic coarctation [0]
- 2) Cardiomyopathy [0]
- 3) Essential hypertension [0]
- 4) Left renal artery stenosis [0]
- 5) Mitral valve stenosis [100]

Mitral valve stenosis leads to left atrial enlargement, but the left ventricle is usually small. An enlarged left atrium may lead to pressure posteriorly on the oesophagus. Most mitral valvular disease in adults results from rheumatic heart disease.

48- Which of the following antiarrhythmic drugs may be used in the treatment of long QT syndrome?

- 1) Amiodarone [0]
- 2) Atenolol [100]
- 3) Flecainide [0]
- 4) Propofanone [0]
- 5) Sotalol [0]

Betablockers are the mainstay of treatment in long QT syndrome. The most commonly used drugs are propranolol and nadolol but metoprolol and atenolol are also used. Implantable Cardioverter-Defibrillators are the most effective treatment in high risk cases. The others drugs may produce a prolongation of the QT interval exacerbating risk of polymorphic VT and Torsades de pointes. For a list of drugs see QTdrugs.org. For an example of long QT syndrome see ECGlibrary.com.

<http://www.qtdrugs.org/>
http://www.ecglibrary.com/l_qt.html

49- A 70 year old male was receiving amiodarone 200 mg daily for intermittent atrial fibrillation. However, he was aware of tiredness and lethargy. He appeared clinically euthyroid with no palpable goitre. Investigations revealed:

Serum free T4 23pmol/L (9-26)
Serum total T3 0.8 nmol/L (0.9-2.8)
Serum TSH 8.2 mU/L (<5)

Which of the following statements would explain these results?

- 1) Abnormal thyroxine binding globulin [0]
- 2) Amiodarone-induced hypothyroidism [100]
- 3) 'sick euthyroid' syndrome [0]
- 4) Spontaneous hypothyroidism [0]
- 5) TSH secreting pituitary adenoma [0]

The results show normal T4, low T3 with elevated TSH. These results are typical of amiodarone induced hypothyroidism which inhibits the peripheral conversion of T4 to T3.

50- A 65-year-old woman, a heavy smoker for many years, has had worsening dyspnoea for the past 5 years, without a significant cough. A chest X-ray shows increased lung size along with flattening of the diaphragms, consistent with emphysema. Over the next several years she develops worsening peripheral oedema. BP 115/70 mmHg. Which of the following cardiac findings is most likely to be present?

- 1) Constrictive pericarditis [0]
- 2) Left ventricular aneurysm [0]
- 3) Mitral valve stenosis [0]
- 4) Non-bacterial thrombotic endocarditis [0]
- 5) Right ventricular hypertrophy [100]

This lady has Chronic Obstructive Airways disease and subsequent Cor Pulmonale leading to right heart failure. Non-bacterial thrombotic endocarditis is a condition seen in frail ill individuals.

51- An elderly man with a history of asthma, congestive heart failure, and peptic ulcer disease is admitted with bronchospasm and rapid atrial fibrillation. He receives frequent nebulised salbutamol and IV digoxin loading, his regular medications are continued. 24 hours after admission his serum potassium is noted to be 2.8 mmol/l. Which of his medications is most likely to have caused this abnormality.

- 1) Digoxin [0]
- 2) ACE inhibitor [0]
- 3) Salbutamol [100]
- 4) Ranitidine [0]
- 5) Spironolactone [0]

Salbutamol given in regular nebulised doses or IV is commonly associated with hypokalaemia. Spironolactone and ACE inhibitors commonly cause hyperkalaemia (their use in combination is potentially dangerous and requires regular monitoring of serum electrolytes). Electrolyte disturbance with Ranitidine is very uncommon. Digoxin doesn't cause hypokalaemia (unless due to vomiting associated with digoxin toxicity). Hypokalaemia (usually diuretic induced) does increase cardiac sensitivity to Digoxin and correction of hypokalaemia is recommended to avoid arrhythmias.

52- In the diagnosis of rheumatic fever, which of the following may be helpful?

- 1) A generalised macular-papular rash. [0]
- 2) ASO titre of less than 1:200. [0]
- 3) Polyarthrititis. [100]
- 4) Staphylococcus aureus grown on throat culture. [0]
- 5) Splinter haemorrhages. [0]

A Jones criteria require two major or one major and two minor, and evidence of recent streptococcal infection for the diagnosis of rheumatic fever. MAJOR: - Pancarditis. - Polyarthrititis - Erythema marginatum - Chorea - Subcutaneous nodules - The rash is macular. MINOR: - Fever - Polyarthralgia - History of RF - Raised ESR/CRP - Prolonged PR interval on ECG.
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53- A 55 year old man presents with gynaecomastia while receiving treatment for Heart failure.

Which of the following drugs is most likely to be the cause of his gynaecomastia

- 1) Amiloride [0]
- 2) Carvedilol [0]
- 3) Frusemide [0]
- 4) Omeprazole [100]
- 5) Ramipril [0]

Omeprazole is associated with gynaecomastia.

54- A 78 year old female is referred by her GP with high blood pressure. Over the last three months her blood pressure is noted to be around 180/80 mmHg. She has a body mass index of 25.5kg/m², is a non-smoker.

There are no features to suggest a secondary cause for her hypertension. Which of the following is the most appropriate treatment for her blood pressure?

- 1) Alpha-Blocker [0]
- 2) Angiotensin Converting Enzyme (ACE) Inhibitor [0]
- 3) Angiotensin Blocker [0]
- 4) Beta-blocker [0]
- 5) Calcium channel blocker [100]

This patient has isolated systolic hypertension (systolic BP >160 and diastolic BP <90) which is the typical hypertension in the elderly population and is associated with a greater risk than combined systolic/diastolic hypertension. Based upon studies such as SHEP and Syst-Eur, guidelines suggest treatment with either Calcium antagonists or diuretics.

55- A 17-year-old woman loses consciousness while out jogging one afternoon, as she has done for many years. She is taken to Accident and Emergency, where a chest X-ray, CT brain scan, FBC, and biochemistry are all normal. Over the next year, she develops mild dyspnea and fatigue. There are several episodes of pre-syncope. After another syncopal episode, she is referred to a cardiologist who orders and ECG that

shows changes of left ventricular hypertrophy and broad Q waves. An echocardiogram reveals left ventricular and septal hypertrophy, small left ventricle, and reduced septal excursion. The septum has a "ground glass" appearance. She then dies suddenly and unexpectedly. The microscopic appearance of the septum with trichrome stain reveals myofiber disarray. Which of the following conditions is she most likely to have had?

- 1) Diabetes mellitus [0]
- 2) Hypertrophic cardiomyopathy [100]
- 3) Rheumatic heart disease [0]
- 4) Systemic lupus erythematosus [0]
- 5) Viral myocarditis [0]

Myofiber disarray is the key feature of hypertrophic cardiomyopathy, an uncommon condition. The abnormal myocardium can be the focus for development of arrhythmias. A viral myocarditis can be the cause for sudden death, but there is myocyte necrosis with interstitial infiltrates of lymphocytes in all chambers.

56- Which of the following is true regarding the coronary circulation?

- 1) Adenosine is the most important mediator of metabolic vasodilation. [100]
- 2) Coronary blood flow is independent of myocardial oxygen consumption due to autoregulation. [0]
- 3) Coronary blood flow within a normal range of blood pressure is primarily determined by perfusion pressure. [0]
- 4) Increased myocardial O₂ demand is met primarily by increasing O₂ extraction. [0]
- 5) The vasodilatory reserve of the epicardium and endocardium is equivalent under normal physiologic conditions. [0]

57- A 54 year old man presents with central crushing chest pain. Examination is normal. 12-lead ECG shows ST segment elevation in leads II, III, aVF and ST depression in V1, V2 and V3. Which coronary artery is occluded?

- 1) Circumflex [0]
- 2) Left Anterior Descending [0]
- 3) Left Main Stem [0]
- 4) Obtuse Marginal [0]
- 5) Right Coronary Artery [100]

The ECG describes an infero-posterior MI. This territory is supplied by a dominant Right Coronary Artery. The concept of coronary dominance refers to which coronary artery supplies the posterior descending coronary artery. In the case of approximately 85% of patients this is the right coronary artery with about 15% of patients having a dominant left circumflex. The territories supplied by the arteries are as follows:

Circumflex: Lateral

Left Anterior Descending: Anterior and septum

Left Main Stem: Branches into the Left Anterior Descending artery and Circumflex and supplies most of the left ventricle. Complete Left Main Stem occlusion is invariably fatal.

Obtuse Marginal: One of the branches of the circumflex and supplies the 'high lateral' region of the left ventricle (ECG leads I and aVR).

Basic understanding of coronary anatomy is important, as this is predictive of problems following MI. For example, the right coronary artery supplies the AV node, so heart block following inferior MI is common. However, heart block following anterior MI is a grave prognostic marker as this indicates a large anterior wall infarct. The right coronary system also supplies the right ventricle, hence problems relating to a right ventricular infarct are commonly associated with an inferior MI.

Further reading at <http://www.med.yale.edu/>

http://www.med.yale.edu/intmed/cardio/imaging/anatomy/coronary_territories/

58- Which of the following is true regarding mitral stenosis?

- 1) it is tolerated well in pregnancy [0]
- 2) there is characteristically a low wedge pressure [0]
- 3) in AF, the opening snap disappears [0]
- 4) The opening snap is not heard when the mitral valve is heavily calcified [100]
- 5) Doppler U/S is usually inaccurate in determining severity [0]

Mitral stenosis is typically a consequence of childhood rheumatic fever but congenital disease is well recognised. It is associated with a tapping apex beat, a loud S1, Opening snap and Mid diastolic rumble with pre-systolic accentuation in those in sinus rhythm. The opening snap is characteristically lost with heavy valvular calcification. In particular Mitral stenosis is poorly tolerated in pregnancy due to volume overload. It is well characterised by doppler echocardiography. (Dr Jacob Easaw)

59- A 26-year-old man is noted to have cyanosis of the lower limbs and clubbing of the toes but not the fingers. Which of the following statements is true?

- 1) He has Eisenmenger's syndrome. [100]
- 2) He has coarctation of the aorta. [0]
- 3) He is likely to have a loud continuous 'machinery' murmur below the left clavicle. [0]
- 4) He is likely to need urgent surgery. [0]
- 5) He has had a Blalock shunt operation. [0]

This is the differential cyanosis of a reversed patent ductus arteriosus (PDA). There is a right-left shunt from the pulmonary artery to the aorta just distal to the left subclavian artery.

Coarctation causes radiofemoral delay. It may be associated with PDA but there is no suggestion in this patient.

Continuous machinery murmur is the classic murmur of PDA but when the shunt reverses (as in patients with a large PDA and/or pulmonary disease) the murmur becomes softer and shorter.

When Eisenmenger's syndrome has developed surgery is associated with a very high mortality.

A Blalock shunt (anastomosis of subclavian artery to pulmonary artery) used to be performed for Fallot's tetralogy and leads to a weak left radial pulse.

60- A 74-year-old man has had increasingly severe, throbbing headaches for several months, centered on the right. There is a palpable tender cord-like area over his right temple. His heart rate is regular with no murmurs, gallops, or rubs. Pulses are equal and full in all extremities, BP is 110/85 mmHg. A biopsy of this lesion is obtained, and histologic examination reveals a muscular artery with luminal narrowing and medial inflammation with lymphocytes, macrophages, and occasional giant cells. He improves with a course of high-dose corticosteroid therapy. Which of the following laboratory test findings is most likely to be present with this disease?

- 1) Anti-double stranded DNA titer of 1:1024 [0]
- 2) Erythrocyte sedimentation rate of 110 mm/hr [100]
- 3) HDL cholesterol of 0.6 mmol/L [0]
- 4) pANCA titer of 1:160 [0]
- 5) Rheumatoid factor titer of 80 IU/mL [0]

These are classic findings for temporal arteritis, the most typical involvement with giant cell arteritis. Corticosteroid therapy typically produces a reduction of symptoms. Not treating this condition puts the patient at risk for involvement of other branches of the external carotid artery, the worst of which would be the ophthalmic branch.

61- A 27 year old woman complained of palpitations, breathlessness and chest pain, radiating to the left arm. These symptoms had developed six weeks previously, after she had witnessed her father dying from a myocardial infarction. In the past 10 years she had been investigated for abdominal pain, headaches, joint pains, and dyspareunia, without serious cause being found for these symptoms.

What is the most likely diagnosis?

- 1) Depressive episode [0]
- 2) Factitious disorder [0]
- 3) Generalized anxiety disorder [0]
- 4) Hypochondriasis [0]
- 5) Somatization disorder [100]

Although the brief scenario does not have quite enough criteria to fulfill a diagnosis there is enough to make somatization disorder the most likely answer. Somatization disorder is characterized by multiple recurring pains and gastrointestinal, sexual, and pseudo-neurologic symptoms that occur over a period of years. To meet the diagnostic criteria for somatization disorder, the patients' physical complaints must not be intentionally induced and must result in medical attention or significant impairment in social, occupational, or other important areas of functioning. By definition, the first symptoms appear in adolescence and the full criteria are met by 30 years of age. Of all the other disorders "factitious disorder" would seem the least likely. The other three are possible explanations but not as likely as somatization.

62- A 35-year-old healthy woman has a faint systolic murmur on physical examination. An echocardiogram is performed, and she is found to have a bicuspid

aortic valve. In explaining the meaning of this finding to her, the most appropriate statement is that?

- 1) An aortic valve prosthesis may eventually need to be placed [100]
- 2) Other family members may have the same condition [0]
- 3) She should be treated with a cholesterol-lowering agent [0]
- 4) The problem resulted from past injection drug usage [0]
- 5) This is one manifestation of an underlying autoimmune disease process [0]

Bicuspid aortic valve is perhaps the most common form of congenital heart disease in adults. Bicuspid valves have a propensity to wear out and calcify with aging. Bicuspid aortic valve tends to be a sporadic.

63- Which of the following findings is the most specific for a diagnosis of myocardial infarction?

- 1) an akinetic area of LV wall motion on ECHO [0]
- 2) elevated cardiac enzymes [0]
- 3) evolution of Q waves on ECG [100]
- 4) history of severe chest pain [0]
- 5) ST elevation on ECG [0]

64- A 15 year old female presents following a sore throat with chest pain, fever, and a skin rash. Examination reveals a diastolic murmur. Her ASO titre is elevated. Which of the following is a major criterion for the diagnosis of Rheumatic fever?

- 1) Fever [0]
- 2) Raised ESR [0]
- 3) Polyarthrititis [100]
- 4) Migratory erythema [0]
- 5) Prolonged PR interval [0]

Polyarthrititis together with erythema marginatum, Sydenham's chorea, carditis and subcutaneous nodules constitute the major criteria associated with Rheumatic fever. Minor criteria include raised ESR, Arthralgia, pyrexia and a prolonged PR interval. Migratory erythema is associated with a glucagonoma.

65- A 55-year-old man with Type 2 Diabetes Mellitus and Ischaemic Heart Disease has been researching the Internet! He asks your opinion on Laser Transmyocardial Revascularisation. Which of the following statements about this technique is true?

- 1) avoids the need for major surgery [0]
- 2) damages the endocardium [100]
- 3) involves destruction of coronary stenoses [0]
- 4) is of particular use in severe proximal coronary artery disease [0]
- 5) stimulates collateral vessel formation [0]

Open chest surgery is undertaken during which laser holes are punched from the epicardial surface into areas of suspected ischaemic or hibernating ventricular muscle. The process is not fully understood. The epicardial end of the hole heals up leaving artificial channels communicating with the ventricular chamber and effectively forming new coronary vessels.

Laser transmyocardial revascularisation has potential in distal disease such as in Diabetes - Angioplasty and CABG are useful in proximal disease.
Further reading Laser Percutaneous Myocardial Revascularisation : A Treatment in Genesis.

66- On auscultation of the heart of a 30 year old female a loud first heart sound is heard. Which of the following may be responsible for this auscultatory feature?

- 1) a long preceding diastolic interval [0]
- 2) Atrial premature beat [100]
- 3) increased pulmonary arterial pressure [0]
- 4) increased systemic arterial pressure [0]
- 5) rupture of a papillary muscle [0]

A loud first heart sound is due to abrupt closure of the mitral valve against a high left atrial pressure and may occur with shortened diastole, mitral stenosis or left-right shunts. It can also be heard with atrial premature beats. MR occurs with papillary muscle rupture and thereby 1st heart sound is soft. A2 and P2 are loud in systemic HT and pulmonary hypertension respectively.

67- A 64-year-old man is admitted with a right femoral neck fracture following a fall. Also seen in the radiograph of the pelvis are several prominent calcified vessels. What is the most appropriate next step in management of this finding?

- 1) anticoagulate with heparin [0]
- 2) Ignore it [100]
- 3) Order a pulmonary ventilation-perfusion scan [0]
- 4) Request a serum troponin test [0]
- 5) Start the patient on a nitrate infusion [0]

This finding is typical for Monckeberg's calcific medial sclerosis, a benign condition involving muscular arteries of older persons.

68- A 59-year-old man who was active all his life develops sudden severe anterior chest pain that radiates to his back. Within minutes, he is unconscious. He has a history of hypertension, but a recent treadmill test had revealed no evidence for cardiac disease. Which of the following is the most likely diagnosis?

- 1) Acute myocardial infarction [0]
- 2) Group A streptococcal infection [0]
- 3) Pulmonary embolus [0]
- 4) Right middle cerebral artery embolus [0]
- 5) Tear in the aortic intima [100]

The history is typical of aortic dissection. All the others could cause sudden collapse but not with acute chest pain radiating to the back in the presence of a recent normal exercise test. Acute MI is possible but not the most likely.

69- Which ONE of the following statements is true about the diastolic Austin Flint murmur?

- 1) It is associated with a loud first heart sound. [0]
- 2) It is an early sign of aortic regurgitation [0]
- 3) It can be distinguished from the murmur of mitral stenosis by absence of presystolic accentuation [0]
- 4) It is due to partial closure of the anterior leaflet of the mitral valve [100]
- 5) It does not occur in aortic incompetence secondary to an aortitis [0]

The Austin Flint murmur is a low frequency mid/late diastolic murmur which may show pre-systolic accentuation which is virtually indistinguishable from that of mitral stenosis. There is no correlation between presence of murmur and severity of AR, or aetiology. The first heart sound is normal but in severe cases, it may be absent.

70- A 28-year-old man who is known to have Hypertrophic Cardiomyopathy has an out of hospital cardiac arrest and is successfully resuscitated. What is the most appropriate mode of treatment?

- 1) Alcohol Septal Ablation [0]
- 2) Amiodarone [0]
- 3) Beta Blocker [0]
- 4) Implantable Defibrillator [100]
- 5) Myomectomy [0]

Patients with HCM are at increased risk of sudden cardiac death due to VF/VT. Implantable Cardio Defibrillators (ICD) are superior to Amiodarone or Beta Blockers for preventing this. Reducing outflow tract obstruction with myomectomy or Alcohol Septal Ablation does not reduce the risk of SCD.

Other indications for ICD implantation include

Cardiac arrest due to VF/VT

Sustained VT causing haemodynamic compromise

Chronic Heart Failure, LVEF<40% and associated syncopal episodes due to Non Sustained VT

Post-MI Non Sustained VT with LVEF<40%

Arrhythmogenic right ventricular cardiomyopathy causing cardiac arrest

Congenital Long QT with family history of sudden cardiac death at young age.

For European Society of Cardiology guidelines on ICD implantation visit:

<http://medc.uni-muenster.de/medc/dienstleistungen/public/PDF/icd-esc-guidelines-2001.pdf>

71- A 14 year old boy presents with fever. Which of the following might contribute to a diagnosis of rheumatic fever?

- 1) The finding of target lesions on the hands. [0]
- 2) The finding of tender nodules in the fingertips. [0]
- 3) A prolonged PR interval on ECG. [100]
- 4) A CRP of 10. [0]
- 5) Positive Romberg's sign. [0]

The modified Jones Criteria include: Finding of preceeding streptococcal infection (recent scarlett fever, raised ASOT or other streptococcal antibodies, positive throat swab for Group A Strep). Plus:

a) MAJOR CRITERIA:

Carditis

Polyarthritis

Chorea

Subcutaneous nodules

Erythema marginatum.

b) MINOR CRITERIA:

Fever

Arthralgia

Previous history of rheumatic fever

Elevated acute phase reactions

Prolonged PR interval.

Erythema marginatum involves red circular lesions which gradually enlarge with central clearing. Sydenham's chorea consists of choreoathetoid movements with increased clumsiness, e.g. deteriorating handwriting. This is often associated with emotional lability. Target lesions suggest erythema multiforme. A CRP of 10 is not elevated much beyond the normal range. Erythema marginatum initially manifests as non-specific pink macules seen over the trunk, with later blanching in the middle of the lesions and sometimes fusing of the borders resulting in a serpiginous (serpent-like) looking lesion. The rash is worsened with heat, but is characteristically evanescent. It does not itch, and can be mistaken for the rash of Lyme disease. Subcutaneous nodules are pea-sized, firm and non-tender. There is no associated inflammation and they are characteristically seen on the extensor surfaces of joints such as knees and elbows and also over the spine.

72- A 40-year-old man attending a routing screening has a blood pressure of 166/100 mmHg. Two weeks later his blood pressure was 150/90 mmHg. He does not smoke. He drinks 35 units alcohol / week. His body mass index (BMI) is 30 kg/m² (20 - 25). What is the best management strategy?

- 1) amlodipine [0]
- 2) atenolol [0]
- 3) bendrofluazide [0]
- 4) enalapril [0]
- 5) lifestyle advice [100]

This 40 year old male has Grade 2 obesity as evidenced by his body mass index (Grade 1 = 25-30 , Grade 2 = 30-40 and Grade 3 = > 40). Hypertension in this individual is most likely due to obesity-related hypertension or due to pseudo-cushings syndrome in view of his high alcohol intake and increased BMI. Heightened sympathetic nervous system activity, hyper-insulinemia, insulin resistance, and hyperleptin-emia contribute to obesity-related hypertension.

He needs lifestyle advice about reducing his alcohol intake and a compatible dietary advice to reduce his weight.

73- A 19-year-old woman is found to have a cardiac murmur characterized by a mid-systolic click. An echocardiogram reveals mitral insufficiency with upward displacement of one leaflet. There is also aortic root dilation to 4 cm. She has a dislocated right ocular crystalline lens. She dies suddenly and unexpectedly. The medical examiner finds a prolapsed mitral valve with elongation, thinning, and rupture of chordae tendineae. A mutation involving which of the following genes is most likely to be present in this patient?

- 1) Beta-myosin [0]
- 2) CFTR [0]
- 3) FGFR [0]
- 4) Fibrillin [100]
- 5) Spectrin [0]

Marfan syndrome is a connective tissue disorder that is associated with floppy mitral valve and also with cystic medial necrosis that predisposes to aortic dissection. Abnormalities of the beta-myosin gene may be associated with some forms of dilated cardiomyopathy. The CFTR gene is associated with cystic fibrosis. The obstructive lung disease from widespread bronchiectasis that results from cystic fibrosis involving the lung can lead to pulmonary hypertension with cor pulmonale. The fibroblast growth factor receptor (FGFR) gene mutations can be associated with skeletal dysplasias. The spectrin gene mutation can be associated with red cell membrane abnormalities associated with hereditary spherocytosis. Anemias in adults with this condition are not typically severe, though anemias in general can increase cardiac stress.

74- A 51 year old businessman complains of dyspnoea on exertion. He recently returned from a business trip to the USA. He has distant heart sounds on auscultation of the chest. A chest radiograph reveals that there is a thin rim of calcification surrounding the cardiac outline. Which of the following conditions is most likely responsible for these findings?

- 1) Uraemia [0]
- 2) Tuberculosis [100]
- 3) Group B coxsackie virus [0]
- 4) Sarcoidosis [0]
- 5) Metastatic carcinoma [0]

The most likely diagnosis is a constrictive pericarditis. The most probable cause for this is previous tuberculous infection which may have occurred many years previously. Acute TB would usually cause a constrictive pericarditis secondary to a pericardial effusion, but is not normally associated with calcification. Uraemia can cause a constrictive pericarditis, as can a pericardial malignancy, and coxsackie virus (secondary to a pericarditis) but calcification would be unusual. Sarcoid can cause both pericardial as well as restrictive cardiomyopathy but calcification would be unusual.

75- A 60-year-old woman is admitted with sudden onset of chest pain and is diagnosed with an acute myocardial infarction. Her acute illness is complicated by

low blood pressure and poor tissue perfusion for several days. Her serum lactate becomes elevated. Her serum urea and creatinine are noted to be increasing.

Day 1 Day 2 Day 3
urea (mmol/L) 8 22 30
creatinine (μmol/L) 116 140 200

Granular and hyaline casts are present on microscopic urinalysis. The renal lesion that is most likely to be present in this situation is?

- 1) Acute tubular necrosis [100]
- 2) Minimal change disease [0]
- 3) Nodular glomerulosclerosis [0]
- 4) Pyelonephritis [0]
- 5) Renal vein thrombosis [0]

Ischaemia, typically in hypotensive hospitalized patients, is the most frequent antecedent to acute tubular necrosis. Blood pressure should be maintained in cardiogenic shock with fluids and / or inotropic agents.

76- A 45 year old male type 1 diabetic with a number of complex diabetic gastrointestinal complications is noted to have a PR interval of 0.18s, a QRS duration of 0.1s and a QT interval of 0.48s on routine ECG. Which of the following drugs may be responsible?

- 1) Cisapride [100]
- 2) Octreotide [0]
- 3) Co-trimoxazole [0]
- 4) Domperidone [0]
- 5) Cimetidine [0]

Cisapride has been withdrawn due to the problem of prolonged QT interval and torsades de pointe. Prolonged QT is defined as greater than 0.45s. Other agents include amitriptyline and phenothiazines yet metoclopramide and domperidone are not associated.

77- You are asked to see a patient in the Intensive Care Unit who is short of breath and tachycardic to rule out a cardiac cause of her symptoms. A right heart catheter reveals that the mixed venous O₂ saturation is 70%; the pulmonary capillary wedge O₂ saturation is 97%. The haemoglobin is normal and the patient is afebrile. You are able to state which of the following?

- 1) her cardiac output is decreased [0]
- 2) her cardiac output is normal [100]
- 3) her heart is normal [0]
- 4) she has high-output failure [0]
- 5) she is in shock due to a non-cardiac cause [0]

78- A 59-year-old man who was active all his life develops sudden severe anterior chest pain that radiates to his back. Within minutes, he is unconscious. He has a

history of hypertension, but a recent treadmill test had revealed no evidence of cardiac disease.

Which of the following do you suspect?

- 1) Acute viral myocarditis [0]
- 2) Group A streptococcal infection [0]
- 3) Pulmonary embolus [0]
- 4) Right middle cerebral artery embolus [0]
- 5) Tear in the aortic intima [100]

This gentleman has the hallmarks of the presentation of an aortic dissection. Dissection is associated with hypertension in 80% of cases. The pain described is typical, especially if the tear is in the ascending aorta (accounting for 60% of total dissections), as the right coronary cusp may be involved, mimicking an inferior infarct. Aortic dissection is an important differential diagnosis of myocardial infarction. We know that this man is unlikely to have cardiac disease, given his negative exercise test.

79- Concerning complete atrioventricular septal defects which of the following statements is true?

- 1) are seen frequently in patients with trisomy 21 [100]
- 2) frequently have aortic valve insufficiency [0]
- 3) have a normal mitral valve structure [0]
- 4) include a coronary sinus atrial septal defect [0]
- 5) include a perimembranous ventricular septal defect [0]

80- 21 year-old woman has a history of palpitations and light headedness. ECG shows short PR interval and inferior Q waves. Her symptoms improve with atenolol 25 mg/day but she has had two short episodes of similar symptoms in the previous 24 hours. What is the long-term management of choice?

- 1) Anticoagulation. [0]
- 2) Oral amiodarone. [0]
- 3) Oral digoxin. [0]
- 4) Increase the dose of atenolol. [0]
- 5) Radiofrequency ablation. [100]

WPW can be associated with negative delta waves in II, III and aVF. The longterm management of choice is ablation of the accessory pathway.

81- A 60-year-old man's echocardiogram shows a dilated left ventricular cavity with the remainder of the other chamber sizes normal. The most likely diagnosis is which of the following?

- 1) aortic regurgitation [100]
- 2) aortic stenosis [0]
- 3) hypertensive heart disease [0]
- 4) mitral regurgitation [0]
- 5) mitral stenosis [0]

82- Left axis deviation is seen on the ECG in which of the following conditions?

- 1) atrioventricular canal defects. [100]
- 2) Ebstein's anomaly. [0]
- 3) large ventricular septal defect. [0]
- 4) patent ductus arteriosus. [0]
- 5) tetralogy of Fallot. [0]

Left axis deviation is also seen in tricuspid atresia.

83- Which of the following is true regarding the action of Clopidogrel?

- 1) It inhibits cyclo-oxygenase [0]
- 2) It is an ADP receptor antagonist [100]
- 3) It is a glycoprotein IIb/IIIa inhibitor [0]
- 4) It is a selective factor Xa inhibitor [0]
- 5) It is Hydroxymethyl Coenzyme A inhibitor [0]

Clopidogrel prevents platelet aggregation through antagonism of the ADP receptor. It has been shown to reduce mortality from stroke and IHD in primary prevention studies.

84- Which ONE of the following is associated with Marfan's syndrome?

- 1) Autosomal recessive inheritance [0]
- 2) increased upper : lower body ratio [0]
- 3) Mental retardation [0]
- 4) Pulmonary stenosis [0]
- 5) Retinal detachment [100]

Marfan's syndrome is an autosomal dominant condition associated with ocular abnormalities such as upwards lens dislocation and retinal detachment. Aortic regurgitation may be a finding and aneurysmal dilatation is a feature. Upper to lower body ratio (head to symphysis pubis : Symphysis pubis to toes) is decreased in Marfan Syndrome.

<http://www.onexamination.com/site/Paedia.asp?id=598>

85- A 30-year-old intravenous drug abuser develops acute aortic regurgitation due to infective endocarditis. Which of the following is least likely to be found on clinical examination?

- 1) decreased cardiac output [0]
- 2) decrescendo diastolic murmur [0]
- 3) hypotension [0]
- 4) mitral valve pre-closure [0]
- 5) peripheral vasodilatation [100]

86- A 67 year old man presents with sudden onset atrial fibrillation (ventricular rate of 150/minute). His serum creatinine concentration was 250 umol/L (70-110).

What is the main factor that determines the choice of loading dose of digoxin in this patient?

- 1) Absorption [0]
- 2) Apparent volume of distribution [0]
- 3) Lipid solubility [0]
- 4) Plasma half-life [0]
- 5) Renal clearance [100]

The pharmacokinetics of digoxin are complex and best explained by a two compartment model. The loading dose is mainly dependent on the Volume of Distribution of a drug but this patient has moderate renal failure. The loading dose is calculated (using various models) by taking into account age, creatinine clearance, body surface area etc. Volume of distribution becomes important particularly when body weight is 40kg or less. On balance it is the renal failure that is the most important factor in this patient in determining the loading dose.

Digoxin is cleared by the kidneys so the maintenance dose would require adjustment in renal failure.

87- A 17-year-old girl is short in stature for her age. She has not shown any changes of puberty. She has a webbed neck. Her vital signs include Temperature 36.6°C Respiratory rate 18/min Pulse 75 bpm and BP 165/85 mmHg. On physical examination, she has a continuous murmur heard over both the front of the chest as well as her back. Her lower extremities are cool with poor capillary filling. A chest radiograph reveals a prominent left heart border, no oedema or effusions, and rib notching. Which of the following pathologic lesions best explains these findings?

- 1) Constriction of the aorta past the ductus arteriosus [100]
- 2) Lack of development of the spiral septum and partial absence of conus musculature [0]
- 3) Shortening and thickening of chordae tendineae of the mitral valve [0]
- 4) Single large atrioventricular valve [0]
- 5) Supraaortic narrowing in the aortic root [0]

She has coarctation of the aorta, and the constriction is postductal, allowing prolonged survival. Her physical characteristics also suggest Turner syndrome (monosomy X).

88- Elevation of the jugular venous pressure during inspiration is most likely to be found in which of the following situations?

- 1) a normal physical exam [0]
- 2) cardiac tamponade [0]
- 3) constrictive pericarditis [100]
- 4) dilated cardiomyopathy [0]
- 5) myocarditis [0]

Kussmaul's sign (a rise in jugular venous pressure on inspiration - the opposite to normal) is seen in both Constrictive Pericarditis and Pericardial Tamponade but it is more likely to be present in the former. However, neither of these are the commonest cause ... can anyone name that?

89- 75 year-old man with a history of anterior MI is taking amiodarone 400mg/day for history of VT. He has a prolonged QT interval on his ECG. What is the most appropriate management?

- 1) Admit to hospital for monitoring. [0]
- 2) Atenolol. [0]
- 3) Change amiodarone to flecainide. [0]
- 4) Continue with amiodarone. [0]
- 5) Discontinue amiodarone immediately. [100]

In iatrogenic long QT which is what this is likely to be, it is safer to stop the offending drug rather than add further drugs on board (eg Beta-blockers even though Atenolol is used for long QT). Flecainide is clearly contraindicated in this situation (CAST study).

90- A 58-year-old man has had an enlarging abdomen for several months. He has experienced no abdominal or chest pain. On physical examination he has a non-tender abdomen with no masses palpable, but there is a fluid thrill. An abdominal Ultrasound Scan shows a large abdominal fluid collection with a small cirrhotic liver. A chest X-ray shows a globally enlarged heart. Which of the following conditions is most likely to be present?

- 1) Dilated cardiomyopathy [100]
- 2) Lymphocytic myocarditis [0]
- 3) Myocardial amyloid deposition [0]
- 4) Nonbacterial thrombotic endocarditis [0]
- 5) Severe occlusive coronary atherosclerosis [0]

This man has alcoholic liver cirrhosis with ascites. The cardiomyopathy of alcoholism is a dilated or congestive form.

91- Angina due to an imbalance between O₂ supply and demand without atherosclerosis would most likely be seen in which of the following circumstances?

- 1) aortic regurgitation [100]
- 2) cardiac tamponade [0]
- 3) pulmonary regurgitation [0]
- 4) right heart failure [0]
- 5) tricuspid regurgitation [0]

92- An 18 year old man had repeated episodes of breathlessness and palpitations, lasting about 20 minutes and resolving gradually. There were no abnormal physical signs.

What is the most likely cause of these features?

- 1) Drug abuse [0]
 - 2) Panic disorder [100]
 - 3) Paroxysmal supraventricular tachycardia [0]
 - 4) Personality disorder [0]
 - 5) Thyrotoxicosis [0]
-

Drug abuse is unlikely since their symptoms are quite short lived. We could expect other symptoms such as GI disturbance, headaches or hypertension to accompany a variety of drug abuse causes. Paroxysmal SVT would start and stop suddenly, not gradually. Personality disorder and thyrotoxicosis would both be expected to lead to symptoms of longer duration with other associated symptoms. This leaves 'panic disorder' as the most likely diagnosis.

93- A previously well 60 year old lady is admitted with an Acute Anterior Myocardial Infarction. A random blood glucose concentration was found to be 12.1 mmol/L (<6.7).

What is the optimal management of her blood sugar?

- 1) Diet [0]
- 2) Gliclazide [0]
- 3) Intravenous insulin plus dextrose [100]
- 4) Metformin [0]
- 5) Subcutaneous insulin [0]

The DIGAMI study has demonstrated that there is a survival advantage in initially treating such patients with elevated glucose concentrations with sliding scale insulin for 24 hours post-infarct and then switching to three months subcutaneous insulin. (Almbrand B, Johannesson M, Sjostrand B, Malmberg K, Ryden L. Cost Effectiveness of Intense Insulin Treatment after Acute Myocardial Infarction in Patients with Diabetes Mellitus. Results from the DIGAMI study Eur Heart J 2000; 21: 733-39)

94- A 65-year-old was advised to start oral digoxin at a dose of 250 µg daily. His physician explained that the full effect of this treatment would not be apparent for at least a week.

Which one of the following pharmacokinetic variables did the physician use to give this explanation?

- 1) bioavailability [0]
- 2) half-life [100]
- 3) plasma protein binding [0]
- 4) renal clearance [0]
- 5) volume of distribution [0]

Digoxin follows first order kinetics and has a half life of 1.6 days in a patient with normal renal function. 65% of the drug absorbed remain in the system after one day. Subsequent doses gradually accumulate until a steady state is achieved after 4 to 5 days.

95- A 75 year-old lady presents with sudden breathlessness and palpitations. On examination, she was observed to have an irregular heart beat with rate of 140 bpm, BP 150/84 and normal heart sounds. On auscultation of the chest, Fine basal crepitations are heard. An ECG confirms AF and an old inferior MI. She is anticoagulated with heparin and given diuretics. Her heart rate remains rapid. What is the most appropriate management of the lady's AF?

- 1) DCCV. [0]

- 2) IV amiodarone. [0]
- 3) IV betablocker. [0]
- 4) IV digoxin. [100]
- 5) Oral quinidine therapy. [0]

The key to this question is that the patient has clinical signs of pulmonary oedema with fast AF. In this age group AF is poorly tolerated and often leads to pulmonary oedema even in the presence of a relatively normal LV. The aim of treatment should be rate control which is best achieved with digoxin in this situation. Betablockers can also be used but due to the fact that they are negatively inotropic are best avoided in acute pulmonary oedema. Emergency DCCV is not required as there is no haemodynamic compromise (BP) yet. Amiodarone would be used if it were thought that cardioversion was possible but is poor at controlling rate compared to digoxin and requires a loading dose. It may even not be possible to cardiovert this patient in the long term depending on duration in AF, LA size, LVEF, LVID etc.

96- A 45 year old female presents with a two day history of fever and joint pains. She has a past history of hypertension for which she is receiving anti-hypertensives. On examination she has a temperature of 38 Celsius, a facial rash and slight swelling with tenderness of the wrist and ankle joints. Which of the following anti-hypertensives may be responsible for her presentation.

- 1) Minoxidil [0]
- 2) Phenoxybenzamine [0]
- 3) Hydralazine [100]
- 4) Alpha-methyldopa [0]
- 5) Bendrofluazide [0]

The presence of fever, facial rash and arthralgia suggest a diagnosis of drug-induced SLE, with hydralazine being a well recognised cause. Gout may be precipitated by bendrofluazide and it also causes a photosensitivity rash but the two diagnoses together with a fever would be remote.

97- A 70-year-old man with dilated cardiomyopathy remains symptomatic in NYHA class 2 due to chronic heart failure. On examination his pulse is 90 regular, BP 140/90, heart sounds normal, chest auscultation did not reveal any abnormalities. He is currently taking Lisinopril 30 mg OD and Frusemide 80 mg OD. What is the best treatment option?

- 1) Amiodarone [0]
- 2) Carvedilol [100]
- 3) Digoxin [0]
- 4) Spironolactone [0]
- 5) Valsartan [0]

Beta blockers improve mortality and quality of life in chronic heart failure (COPERNICUS, MERIT, CIBIS trials). They should be initiated once patients are stable and can be used in all classes of heart failure though they can cause an acute deterioration in patients who have very severe symptoms. They should be avoided in

the acute setting. Spironolactone improves outcome and symptoms in severe (Class 3-4) chronic heart failure (RALES). Valsartan does not affect outcome as add on treatment (VALHEFT). Digoxin may reduce hospitalisation and improves QOL but has a neutral benefit to mortality (DIG study). Amiodarone in the absence of arrhythmias does not affect outcome.

98- A 40-year-old man received an orthotopic cardiac transplant 7 years ago to treat a dilated cardiomyopathy. Since that time he has been healthy, with no episodes of rejection or infection. Over the next year, however, he develops fatigue with exercise. He has worsening pedal edema and orthopnea. On physical examination, his vital signs are Temperature 36.3°C, Pulse 78, Respiratory rate 16, and BP 130/70 mm Hg. There are no murmurs, rubs, or gallops audible. Bibasilar crackles in the lungs are audible. Which of the following conditions is most likely to account for these findings?

- 1) Angiosarcoma [0]
- 2) Coronary arteriopathy [100]
- 3) Mitral valvular stenosis [0]
- 4) Myocarditis [0]
- 5) Pulmonary hypertension [0]

By 5 years following cardiac transplantation, nearly all patients have some degree of small coronary vascular narrowing. Myocarditis is unlikely to be present in the absence of rejection or infection.

99- Which of the following statements concerning the treatment of acute myocardial infarction is correct?

- 1) A pansystolic murmur developing within the first 24 hours does not require further investigation. [0]
- 2) Dipyridamole therapy reduces reinfarction within the first year. [0]
- 3) Heparin is beneficial if given with streptokinase. [0]
- 4) Prophylactic lignocaine given in the first 48 hours is effective in preventing ventricular fibrillation [0]
- 5) Treatment with a dihydropyridine calcium antagonist is associated with increased cardiovascular mortality. [100]

GISSI II revealed no survival advantage of heparin plus streptokinase in acute MI compared with strep alone. ISIS II revealed that dihydropyridine calcium antagonists were associated with increased cardiovascular risk after MI. Dipyridamole does not reduce risk. A newly discovered pansystolic murmur may signify acquired MR or VSD.

100- A 70-year-old man is admitted with an acute Q-wave inferior Myocardial Infarction. On day 5, he suddenly develops pulmonary oedema and a loud systolic murmur. Which of the following would be the most useful in establishing a diagnosis?

- 1) chest X-ray [0]
- 2) coronary arteriography [0]
- 3) ECG [0]
- 4) right heart catheterisation and oximetry [100]

5) serum cardiac enzymes [0]

101- A 65-year-old man has longstanding stable heart failure treated with frusemide and enalapril. He complains of swelling in his left knee and his GP treats him with Rofecoxib, a cyclo-oxygenase-2 (COX-2) inhibitor. Two weeks later the patient has increasing breathlessness and ankle oedema.

Which one of the following effects of rofecoxib is the most likely to explain his symptoms?

- 1) decreased absorption of frusemide from the gut [0]
- 2) decreased myocardial contractility [0]
- 3) reduced effective action of enalapril [0]
- 4) the onset of anaemia [0]
- 5) the onset of fluid retention [100]

Rofecoxib acts by inhibiting prostaglandin synthesis via inhibition of cyclooxygenase-2 (COX-2). It causes fluid retention and can worsen an already pre-existing heart failure as in this case. The CSM reminds prescribers that rofecoxib is contraindicated in patients with severe congestive heart failure, active peptic ulceration or GI bleeding.

102- Which of the following statements are true of coronary artery anatomy?

- 1) Right bundle branch block in acute anterior myocardial infarction suggests obstruction prior to the first septal branch of the left anterior descending coronary artery [100]
- 2) the posterior descending artery is usually a branch of the circumflex artery [0]
- 3) The sinus node is supplied by a branch of the right coronary in over 90% of subjects. [0]
- 4) The AV node is supplied by the left anterior descending coronary artery. [0]
- 5) The left main stem is about 4 cm long [0]

It is sometimes said that questions longer than 2 lines are usually false ... but not in this case.

The posterior descending artery is most often (85%) a branch of the right coronary artery. The sinus node artery is a branch of the right coronary artery in 60% of cases. The AV node is supplied from the posterior descending coronary artery. The left main stem is much shorter than 4 cm!

103- A 34 year old male presents with episodes of breathlessness on exertion. Examination reveals a loud P2 and fixed splitting of the second sound. Which of the following may be responsible for these signs?

- 1) Maternal chicken pox infection [0]
- 2) Maternal thalidomide therapy [0]
- 3) 47 XXY karyotype [0]
- 4) Homocystinuria [0]
- 5) Excess maternal alcohol consumption [100]

Fetal alcohol syndrome, Down's syndrome and Congenital rubella syndrome are associated with an ASD as described in this case with a loud second sound plus fixed splitting.

104- A 72-year-old man presents with an episode of collapse. He has had two similar episodes recently, each lasting about one minute. Four years ago he suffered an anterior myocardial infarction.

On examination he was orientated and symptom-free with a regular pulse rate of 80 bpm, BP 140/80 mmHg and the apex beat was displaced to the left. There was an apical systolic murmur. There were no signs of trauma. ECG showed sinus rhythm, Q waves and ST segment elevation anteriorly without reciprocal depression.

What is the diagnosis?

- 1) acute anterior myocardial infarction [0]
- 2) cerebrovascular accident [0]
- 3) epileptic seizure [0]
- 4) pulmonary embolism [0]
- 5) ventricular tachycardia [100]

The ECG is suggestive of a left ventricular aneurysm, which has a tendency for both an malignant arrhythmogenic focus and also for left ventricular thrombus. The brief episode of loss of consciousness with no residual neurology makes the diagnosis for cerebral embolism unlikely. The story is more suggestive of a ventricular tachycardia and would suggest further investigations. Prolonged heart rhythm monitoring and an echo are recommended. If VT is proven then he should be on amiodarone and the indication for an automated implantable cardioverter/defibrillator strongly considered if the overall LV function is reduced.

105 - Deficiency of which one of the following trace elements is implicated as a cause of cardiomyopathy?

- 1) chromium [0]
- 2) copper [0]
- 3) manganese [0]
- 4) selenium [100]
- 5) zinc [0]

Selenium deficiency is one of the reversible causes of dilated cardiomyopathy.

Hypertension

1- A 40-year-old man attending a routing screening has a blood pressure of 166/100 mmHg. Two weeks later his blood pressure was 150/90 mmHg. He does not smoke. He drinks 35 units alcohol / week. His body mass index (BMI) is 30 kg/m² (20 - 25). What is the best management strategy?

- 1) amlodipine [0]
- 2) atenolol [0]

- 3) bendrofluazide [0]
- 4) enalapril [0]
- 5) lifestyle advice [100]

This 40 year old male has Grade 2 obesity as evidenced by his body mass index (Grade 1 = 25-30 , Grade 2 = 30-40 and Grade 3 = > 40). Hypertension in this individual is most likely due to obesity-related hypertension or due to pseudo-cushings syndrome in view of his high alcohol intake and increased BMI. Heightened sympathetic nervous system activity, hyper-insulinemia, insulin resistance, and hyperleptin-emia contribute to obesity-related hypertension.

He needs lifestyle advice about reducing his alcohol intake and a compatible dietary advice to reduce his weight.

2- A 78 year old female is referred by her GP with high blood pressure. Over the last three months her blood pressure is noted to be around 180/80 mmHg. She has a body mass index of 25.5kg/m², is a non-smoker.

There are no features to suggest a secondary cause for her hypertension. Which of the following is the most appropriate treatment for her blood pressure?

- 1) Alpha-Blocker [0]
- 2) Angiotensin Converting Enzyme (ACE) Inhibitor [0]
- 3) Angiotensin Blocker [0]
- 4) Beta-blocker [0]
- 5) Calcium channel blocker [100]

This patient has isolated systolic hypertension (systolic BP >160 and diastolic BP <90) which is the typical hypertension in the elderly population and is associated with a greater risk than combined systolic/diastolic hypertension. Based upon studies such as SHEP and Syst-Eur, guidelines suggest treatment with either Calcium antagonists or diuretics.

3- Which of the following compounds has a vasodilating effect?

- 1) Antidiuretic hormone [0]
- 2) Calcitonin [100]
- 3) Endothelin [0]
- 4) Renin [0]
- 5) Somatostatin [0]

ADH acts on the Vasopressor receptors to cause vasoconstriction. Endothelin is also a vasoconstrictor as is renin. Somatostatin is also recognised to produce vasoconstriction of the splanchnic system.

4- A 14-year-old boy presents with hypertension. Which of the following statements concerning hypertension in the young is true?

- 1) Sodium nitroprusside is useful for the long-term treatment of severe cases. [0]
- 2) Headache is the usual presenting feature. [0]
- 3) It is defined as systolic blood pressure above the 99th centile for age. [0]

- 4) Abnormalities are frequently seen on DMSA scan. [100]
5) Aortic coarctation is the commonest secondary cause. [0]

D Sodium nitroprusside is useful only in the short term, as cyanide levels accumulate with time. Hypertension is usually diagnosed incidentally, and is defined as systolic blood pressure >95th centile for age. Secondary causes are usually due to renal abnormalities, with reflux associated scarring being the commonest renal disease. This will cause abnormalities on DMSA scan. Coarctation of the aorta is the commonest non-renal cause, with pheochromocytoma/neuroblastoma, congenital adrenal hyperplasia, Cushing Syndrome and steroid therapy being rarer causes.

5- A new antihypertensive drug needs to be investigated to establish its relative potency.

Which of the following techniques is most appropriate for this purpose?

- 1) bioassay [100]
2) case-control study [0]
3) double-blind, randomized, placebo controlled study [0]
4) postmarketing surveillance [0]
5) sequential trial [0]

Biological assays are designed to measure the relative potency of different preparations. Blood pressure is highly variable and is subject to variability because of the patient's level of anxiety and the method used by the observer to measure it. In a test of EFFICACY of an antihypertensive drug, a double-blind, randomized design would be favourable. A sequential trial (a trial in which the data are analysed after each participant's results become available, and the trial continues until a clear benefit is seen in one of the comparison groups) could also be used to assess efficacy, but there would have to be a large expected difference from placebo.

6- A 53-year-old man presented with hypertension of 150/110 and is found to have the following results on investigation. Raised serum sodium, raised urinary potassium excretion and normal serum renin. What is the likely diagnosis?

- 1) Adrenocortical adenoma [100]
2) Coarctation of aorta [0]
3) Malignant hypertension [0]
4) Pheochromocytoma [0]
5) Renal tumour [0]

Aldosterone promotes active sodium transport and excretion of potassium in the renal tubules (and also sweat glands, salivary glands and colon). "Clinically, [Primary hyperaldosteronism] Conn's syndrome is characterized by hypertension (often diastolic hypertension), muscular weakness, paresthesias, headache, polyuria, and polydipsia." Read more ...

<http://www.amershamhealth.com/medcyclopaedia/Volume%20IV%202/ALDOSTERONOMA.asp>

Dermatology

1- Which of the following concerning leg ulcers is correct?

- 1) Diuretics have been shown to be of benefit in the treatment of associated oedema. [0]
- 2) In diabetic ulcers the dressing should be left in situ for no more than 1 week [100]
- 3) Large gravitational ulcers are always painful [0]
- 4) Treating superficial infection with antibiotics has been shown to be beneficial [0]
- 5) ulcers caused by arterial disease are typically treated by compression bandaging [0]

Diuretics are only of value if ulceration is associated with oedema. Gravitational ulcers are not usually painful. If there is no obvious features of surrounding cellulitis, antibiotic therapy is usually unnecessary and has not been shown to improve healing in superficial infection which is common in ulceration.

2- Exposure to sunlight aggravates:

- 1) Pellagra [100]
- 2) Acne vulgaris [0]
- 3) Psoriasis [0]
- 4) Acute Intermittent porphyria [0]
- 5) Xeroderma Elasticum [0]

Exacerbation or localization of other dermatoses is characteristic of pellagra, Hartnup's disease, lupus erythematosus, Darier's disease, rosacea, scleroderma, actinic lichen planus, and lymphocytoma.

3- A 22 year old woman complains of haemoptysis, abdominal pains and pyrexia for a month.

She is admitted to hospital and found to be afebrile and not distressed. There are numerous crusted, linear lesions on her forearms.

What is the most likely diagnosis?

- 1) Acute intermittent Porphyria [0]
- 2) Factitious disorder [100]
- 3) Systemic lupus erythematosus [0]
- 4) TB [0]
- 5) Wegener's granulomatosis [0]

The history is very vague and the patient has no clinical features other than a rash which sounds typical of dermatitis artefacta.

4- Which of the following concerning Pityriasis rosea is correct?

- 1) It is due to a fungal infection [0]
- 2) It is characterised by flat scaly patches [100]
- 3) It is frequently associated with oro-genital itching [0]
- 4) May be preceded by intense itching [0]

5) Tends to recur after apparent cure [0]

Pityriasis rosea is a rash that can occur at any age but it occurs most commonly in people between the ages of 10 and 35 years. It is not caused by a fungus. The condition often begins as a large single pink patch on the chest or back. This patch may be scaly and is called a "herald" or "mother" patch. Within a week or two, more pink patches, sometimes hundreds of them, appear on the body and on the arms and legs. Patches may also occur on the neck, and though rare, the face.

5- A young woman has acne and is taking oral medication. She develops polyarthritis and raised liver enzyme tests. Investigations show

AST 95

ALT 170

bilirubin 16

antinuclear antibodies strongly positive at 1/640, negative at 1/20

Which of the following drugs is she most likely to have been prescribed?

1) erythromycin [0]

2) isotretinoin [0]

3) minocycline [100]

4) oxytetracycline [0]

5) trimethoprim [0]

Except trimethoprim all other drugs are used in the treatment of acne. And all of these can cause hepatotoxicity. Erythromycin usually causes cholestasis. Minocycline can cause drug induced SLE.

6- Which of the following suggests a diagnosis of molluscum contagiosum rather than chickenpox?

1) Presence of macules and papules [0]

2) Absence of erythema surrounding lesions [100]

3) Lesions disappearing within a month [0]

4) Presence of pruritis [0]

5) Positive contact history [0]

Molluscum contagiosum is caused by a DNA pox virus. The lesions are small, skin coloured papules with central umbilication. There is little surrounding inflammation and they may be spread following scratching to other sites. Chickenpox lesions in the early stages may be mistaken for molluscum. However, the presence of associated macules and later vesicles and pustules help to differentiate them. These lesions also affect the mucous membranes, and usually disappear within a few weeks, while molluscum can persist for up to a year.

7- An 18-year-old woman presents with red, tender lumps on her shins and arthralgia. Chest X-ray shows bilateral hilar lymphadenopathy and clear lung fields. A clinical diagnosis of sarcoidosis is made.

Which one of the following is the most appropriate management plan?

- 1) 24 hour urinary calcium measurement [0]
- 2) follow up appointment with chest X-ray in three months [100]
- 3) mediastinoscopy and lymph node biopsy [0]
- 4) skin biopsy [0]
- 5) thoracic CT scan [0]

This is also known as Lofgren's syndrome (a benign form of sarcoidosis). The presentation of erythema nodosum-arthritis-bilateral hilar lymphadenopathy syndrome is so characteristic that histological diagnosis is not necessary. The prognosis is excellent with less than 10% having persistent disease. With less characteristic presentations, positive biopsies are needed. Mediastinoscopy is the method of choice for anterior mediastinal nodes.

8- Which of the following is true regarding diabetic foot ulceration?

- 1) Autonomic neuropathy results in increased resting blood flow [0]
- 2) Callus formation at pressure areas is an important predictor of ulceration [100]
- 3) Plantar ulceration is most commonly due to atherosclerosis. [0]
- 4) Skin infection is the most common initiating event in ulceration. [0]
- 5) Radiography can readily distinguish between Charcot's joint and osteomyelitis. [0]

Callus formation at pressure areas is an important predictor of potential ulceration. Plantar ulceration is usually a consequence of neuropathy and minor skin trauma is probably the most common initiating event. Blood flow is often decreased with autonomic neuropathy hence sympathectomy may be performed to improve skin blood flow. It is difficult to radiographically distinguish between Charcot's joint and osteomyelitis.

9- A 75-year-old female presents with chronic leg ulceration which is a consequence of venous insufficiency.

Which one of the following is the most appropriate management?

- 1) Appropriate systemic antibiotic in preparation for skin grafting [0]
- 2) Compression bandaging [100]
- 3) Improve the venous return by limb elevation [0]
- 4) Skin biopsy to exclude neoplasm [0]
- 5) Vein surgery Exclusion of neoplasm by skin biopsy [0]

Venous ulcers are secondary to venous stasis and chronic stretching vessel of the vein walls of the superficial veins. These eventually become thinner and ulcerate. The only treatment shown in studies to be beneficial for this condition would be to compress the superficial venous using a 4 layer compression bandage. The patient should always have their dopplers and ABPI (ankle brachial pulse index) prior to compression. This should be greater than 1.

10- A 68-year-old woman presents with a 2 month history of a widespread pruritic rash. Examination reveals widespread erythema with several small blisters containing straw-coloured fluid and one or two larger serosanguinous blisters.

What is the most likely diagnosis?

- 1) bullous impetigo [0]
- 2) bullous pemphigoid [100]
- 3) Insect bite [0]
- 4) scabies [0]
- 5) urticarial vasculitis [0]

The causes of a vesicular eruption are rather few but include pemphigoid, Erythema Multiforme and Herpes. This is a classic description of pemphigoid.

11- A 50-year-old man presented in the summer complaining of itching and blistering of his hands and forehead. On examination there were small areas of excoriation on the backs of his hands. What is the most likely diagnosis?

- 1) dermatitis herpetiformis [0]
- 2) lupus erythematosus [0]
- 3) pemphigoid [0]
- 4) pemphigus [0]
- 5) porphyria cutanea tarda [100]

The distribution of the lesions suggests a photosensitive element. Both lupus erythematosus and PCT are associated with a photosensitive elements, however this is more typical of PCT. PCT causes blistering of the hands and the forehead which usually heal with small scar and milia formation. It is also associated with an excessive alcohol intake.

12- A 40-year-old female presents with a six month history of pruritic papules, vesicles and excoriations on the elbows, knees, buttocks and scalp. Her GP has prescribed topical betamethasone therapy which has been unhelpful. What is the most likely diagnosis?

- 1) Atopic dermatitis (Eczema) [0]
- 2) Dermatitis herpetiformis [100]
- 3) Hennoch-Schonlein purpura [0]
- 4) Psoriasis [0]
- 5) Scabies [0]

The question describes the characteristic distribution of the lesions of dermatitis herpetiformis. DH is one of the immunobullous conditions and characteristically has very intensely pruritic vesicles. It is not usually responsive to topical steroids, but would respond well to dapsone. It is associated with gluten sensitivity and coeliac disease. Atopic eczema is non vesicular and would respond to potent topical steroids. HSP is a purpuric rash and is non pruritic. Scabies usually affect the extremities and rarely affects above the neck line. It does not cause papules and vesicles.

13- A 26-year-old man is noted to have cyanosis of the lower limbs and clubbing of the toes but not the fingers. Which of the following statements is true?

- 1) He has Eisenmenger's syndrome. [100]

- 2) He has coarctation of the aorta. [0]
- 3) He is likely to have a loud continuous 'machinery' murmur below the left clavicle. [0]
- 4) He is likely to need urgent surgery. [0]
- 5) He has had a Blalock shunt operation. [0]

This is the differential cyanosis of a reversed patent ductus arteriosus (PDA). There is a right-left shunt from the pulmonary artery to the aorta just distal to the left subclavian artery.

Coarctation causes radiofemoral delay. It may be associated with PDA but there is no suggestion in this patient.

Continuous machinery murmur is the classic murmur of PDA but when the shunt reverses (as in patients with a large PDA and/or pulmonary disease) the murmur becomes softer and shorter.

When Eisenmenger's syndrome has developed surgery is associated with a very high mortality.

A Blalock shunt (anastomosis of subclavian artery to pulmonary artery) used to be performed for Fallot's tetralogy and leads to a weak left radial pulse.

14- A previously fit, 30-year-old female presents with a four day history of intractable pruritus and urticaria. What is the most appropriate initial management?

- 1) Chlorpheniramine [100]
- 2) Prednisolone [0]
- 3) Ranitidine [0]
- 4) Topical hydrocortisone [0]
- 5) topical mepyramine [0]

Urticaria is a common condition and usually responds very well to systemic antihistamines which the correct first line treatment. Oral steroids can be given for severe cases but only as a last resort and topical steroids/ topical antihistamines have no effect.

15- Which of the following is a true of cutaneous anthrax?

- 1) causes a black eschar which overlies pus [0]
- 2) lesions are usually painful and tender [0]
- 3) lesions are associated with marked oedema [100]
- 4) Mortality is approximately 20% despite antibiotic therapy [0]
- 5) Is very likely to occur in subjects exposed to anthrax spores [0]

Anthrax is caused by B Anthracis a gram positive rod. Cutaneous anthrax is associated with a black eschar without pus, tend to be painless and have widespread oedema. Without antibiotics mortality is of the order of 20%, but with antibiotics, mortality is low, which contrasts with pulmonary anthrax.

16- A 22 year old male presents with generalised pruritus of six weeks duration. Examination reveals little except for erythematous papules between the fingers. Which of the following therapies would be most appropriate for this patient?

- 1) Astemizole [0]
- 2) Calamine lotion [0]
- 3) Chlorpromazine [0]
- 4) Ciprofloxacin [0]
- 5) Permethrin cream [100]

This patient has scabies, a highly contagious disease caused by the mite, *Sarcoptes Scabiei*. Appropriate treatment includes Permethrin cream topical Benzyl Benzoate or malathion.

17- A 40-year-old man presented with pityriasis versicolor. What is the most appropriate treatment?

- 1) methotrexate [0]
- 2) oral terbinafine [0]
- 3) psoralen with ultraviolet light (PUVA) therapy [0]
- 4) topical selenium sulphide [100]
- 5) phototherapy with ultraviolet light (UVB) [0]

Pityriasis versicolor (also called tinea versicolor) is a skin lesion caused by a fungus called *Malassezia furfur*. The treatment is topical selenium sulphide. Oral Itraconazole is also effective.

18- Which of the following is a feature of hereditary haemorrhagic telangiectasia?

- 1) a good response to oestrogen therapy [0]
- 2) cerebral arteriovenous malformations [100]
- 3) GI haemorrhage as the usual presenting feature [0]
- 4) telangiectasia of the mucous membranes, but not the skin [0]
- 5) tendency of lesions to become less obvious with age [0]

In hereditary haemorrhagic telangiectasia there may also be pulmonary AV malformations.

Epistaxis, not GI haemorrhage, is the usual presenting feature. Lesions become more obvious with age and affect mucous membranes as well as skin. Oestrogen therapy is sometimes advocated but the effect, if any, is small.

19- Concerning Neurofibromatosis Type 1 (NF1), which one of the following statements is true?

- 1) Bilateral acoustic neuromas are common [0]
- 2) Clinical severity in individuals is similar in a given family [0]
- 3) New mutations occur rarely [0]
- 4) Pigmented spots on the iris are a characteristic feature [100]
- 5) The diagnosis is likely if two café-au-lait patches are present [0]

Lisch nodules of the iris are present in more than 90% of patients.

Bilateral acoustic neuromas is a hallmark feature of neurofibromatosis type 2.

Expressivity of the gene is highly variable and members of the same family usually show wide differences in clinical symptoms.

NF1 is one of the most common autosomal dominant conditions. However almost half of all cases give no family history and are new mutations. The mutation rate is estimated to be 1:10,000 gametes.

The diagnosis is suggested by six or more café- au- lait macules (spots), each over 5 mm in diameter in prepubescent individuals and over 15 mm in postpubertal individuals.

20- A 30 year old woman presents with a skin rash. On applying pressure to an unaffected area of skin it was relatively easy to induce trauma. Increased fragility of the skin is characteristic of which of the following conditions?

- 1) acute intermittent porphyria [0]
- 2) epidermolysis bullosa [100]
- 3) neurofibromatosis [0]
- 4) pseudo-xanthoma elasticum [0]
- 5) tuberous sclerosis [0]

Increased skin fragility is seen in a number of disorders and is used as a clinical test in bullous disorders (Nikolsky's sign). Other causes include Pemphigus vulgaris, porphyria cutanea tarda and drug reactions (especially pseudoporphyria). Other causes of increased skin fragility (not associated with bullae) include long term corticosteroid therapy, Ehlers-Danlos syndrome and Scurvey (vitamin C deficiency).

Nikolsky's sign

Nikolsky's sign is part of the clinical evaluation of bullous skin disorders.

If a bulla extends laterally with pressure it suggests that the epidermis detaches from the skin. Or on normal skin a palpable separation (bulla) may be produced.

Positive in pemphigus vulgaris, staphylococcal scalded skin syndrome, acute generalized exanthematous pustulosis (drug reaction), drug-induced pemphigoid (NOT idiopathic pemphigoid) and toxic epidermal necrolysis.
http://www.turner-white.com/pdf/hp_jan01_skin.pdf

21- A 50-year-old man presented in the summer complaining of itching and blistering of his hands and forehead. On examination there were small areas of excoriation on the backs of his hands. What is the most likely diagnosis?

- 1) dermatitis herpetiformis [0]
- 2) lupus erythematosus [0]
- 3) pemphigoid [0]
- 4) pemphigus [0]
- 5) porphyria cutanea tarda [100]

The distribution of the lesions suggests a photosensitive element. Both lupus erythematosus and PCT are associated with a photosensitive elements, however this is more typical of PCT. PCT causes blistering of the hands and the forehead which usually heal with small scar and milia formation. It is also associated with an excessive alcohol intake.

22- What is the most common presenting feature of porphyria cutanea tarda?

- 1) acute blistering crises affecting the trunk and limbs [0]
- 2) acute redness and swelling following sun exposure [100]
- 3) erythroderma [0]
- 4) generalised hypertrichosis [0]
- 5) skin fragility and blistering affecting the hands, face and scalp [0]

Development of vesicles and bullae on sun exposed areas like the face, dorsa of the hand, feet, forearm and legs is the commonest feature.

23- A 24 year old female presents with vague frontal headaches and visual disturbance. She has a past history of acne for which she is receiving treatment. Examination reveals her to be obese with a blood pressure of 110/70 mmHg. There is absence of the central retinal vein pulsation on fundoscopic examination. Which of the following drugs account for these findings?

- 1) Isotretinoin [0]
- 2) Ampicillin [0]
- 3) Topical tetracycline [0]
- 4) Dianette [100]
- 5) Erythromycin [0]

Dianette, like any oral contraceptive may be associated with Benign Intracranial Hypertension. Topical tetracycline is not associated with BIH. Rarely BIH has been associated with isotretinoin but usually in combination with a tetracycline.

25- A 43 year old woman with atopic dermatitis (atopic eczema) presented with an acute generalized exacerbation of her disease. She was admitted to hospital but failed to improve with emollients, topical betamethasone-17-valerate and oral antihistamine. Which one of the following drugs is the most appropriate treatment?

- 1) Acitretin [0]
- 2) Amoxycillin [0]
- 3) Ciclosporin [100]
- 4) Colchicine [0]
- 5) Dapsone [0]

Cyclosporin is a well used drug in the treatment of atopic dermatitis. It is usually at doses of 2-5 mg/kg. The pathophysiology of AD is complex but the T lymphocytes are involved and it is known that there is an increased production of cytokines particularly IL-4. Ciclosporin is a suppressor of T cells and in that respect works very well in atopic dermatitis and psoriasis. The side effects of hypertension and renal

toxicity limit its use. These patients are seen monthly to have their BP and U+Es checked.

REFERENCES: 1) New Ethicals, May 1996, Vol 33, No5, pg 57

26- Which of the following is a recognised feature of psoriasis?

- 1) Angular stomatitis [0]
- 2) Iridocyclitis [0]
- 3) Koebner Phenomenon [100]
- 4) Loss of hair [0]
- 5) Response to chloroquine [0]

Psoriasis is associated with a dermatopathy and arthropathy which may range from mild distal Interphalangeal joint involvement with nail pitting to severe Arthritis Mutilans. A Koebner Phenomenon refers to outbreak of a skin eruption following minor trauma and is a feature of psoriasis. Psoriatic arthropathy may be associated with an anterior uveitis. Chloroquine may produce a severe attack of psoriasis.

27- Which is true regarding Eczema Herpeticum?

- 1) Is invariably fatal if untreated. [0]
- 2) Usually has an indolent onset. [0]
- 3) Only a single crop of vesicles usually appear. [0]
- 4) Is typically associated with a high fever for over a week. [100]
- 5) Is more severe in reactivation disease. [0]

Eczema herpeticum is the result of primary infection of eczematous skin with HSV. The severity varies from mild to fatal. There is usually an abrupt onset with crops appearing over 7-9 days. These may become coalesced. Typically, the child has a high fever for 700 days, and recurrent attacks can occur. Death can result from physiological disturbances (loss of fluid electrolytes and protein through the skin) or dissemination of the virus to brain and other organs or from secondary bacterial sepsis.

28- A 16-year-old boy presents with erythema nodosum. Which of the following should be considered?

- 1) Reiter's Disease [0]
- 2) Ulcerative colitis [100]
- 3) Cytomegalovirus infection [0]
- 4) Toxoplasmosis [0]
- 5) Kawasaki Disease [0]

Erythema nodosum is characterised by painful, indurated, shiny, red, hot, elevated nodules 1-3cm diameter particularly on the shins. There may be associated fever, malaise, and arthralgia \pm hilar adenopathy. Over a period of days they become violaceous, then dull purple then fade like a large bruise without residual ulceration or scar. There may be crops over 3-6 weeks. They are uncommon under the age of 6, and are commoner in females than males. Causes include:

INFECTIONS:

bacteria: Streptococci, leptospirosis, cat-scratch disease, psittacosis, yersinia.

viruses: EBV.

OTHER:

TB, tularaemia, histoplasmosis, coccidioidomycosis.

DRUGS:

sulphonamides, oral contraceptive pill.

SYSTEMIC DISEASES:

SLE, vasculitis, regional enteritis, ulcerative colitis, Behçet Syndrome.

29- A 58-year-old man has a history of obesity, gastro-oesophageal reflux disease, low back pain and IHD. He presents with large, itchy wheals over the trunk and limbs and a sensation of tightness in the throat. Which one of the following drugs is the most likely to have triggered this skin eruption?

- 1) aspirin [100]
- 2) GTN (nitrate) spray [0]
- 3) omeprazole [0]
- 4) paracetamol [0]
- 5) simvastatin [0]

In hypersensitive patients aspirin can cause angioedema, bronchospasm and urticaria(skin rashes).

30- Which statement regarding tinea capitis is correct?

- 1) It is most commonly caused by the fungus microsporum canis. [0]
- 2) Its presence should suggest immunological deficiency. [0]
- 3) It often results in permanent alopecia. [0]
- 4) It causes patches that fluoresce dull green under Wood's lamp. [100]
- 5) It is effectively treated with topical Nystatin ointment. [0]

Tinea capitis is a dermatophyte infection of the scalp most often caused by trichophyton tonsurans, and occasionally by microsporum canis. It is commonest in areas of socio-economic deprivation. M. canis is a zoophilic species acquired from cats and dogs. There is initially a small papule at the base of the hair follicle which spread peripherally forming a scaly circular plaque (ringworm) within which there are brittle, broken infected hairs (exclamation mark hairs). Confluent patches of alopecia develop and there may be pruritis. Sometimes a severe inflammatory response produces an elevated boggy granulomatous mass (kerion), studded with sterile pustules. There may be fever and regional lymphadenopathy, and occasionally permanent scarring and alopecia may result. The crusted patches fluoresce dull green under Wood's light. Microscopic examination of a KOH preparation shows tiny spores and the fungi may be grown in Sabouraud medium with antibiotics. Oral griseofulvin for 2-3 months is required, or Ketoconazole for resistant cases.

31- Which of the following may be responsible for an acute relapse of Systemic Lupus Erythematosus in a 38 year old female?

- 1) hydralazine therapy [0]
- 2) Pregnancy [100]

- 3) Progesterone only contraceptive pill [0]
- 4) Salmeterol therapy [0]
- 5) Winter holiday in Lapland [0]

Some physiological and environmental factors affect the periods of deterioration and of remission in systemic lupus erythematosus. These factors include HRT and particularly the oral contraceptive, pregnancy and infection. It would not be expected with the progesterone only oral contraceptive. You would expect to find virtually no sun on a winter holiday in Lapland (Arctic Circle)! A number of drugs (hydralazine, procainamide, isoniazid, chlorpromazine, D-penicillamine and methyldopa) can result in drug-induced lupus in predisposed individuals. This can be differentiated from the idiopathic SLE on genetic and immunologic grounds. Furthermore, it is mild and reversible on stopping the drug, renal disease and double stranded anti-DNA are rare (although antibodies specific for histones may be present) and the sex ratio is equal. They do not cause deterioration in patients with SLE.

32- A 38 year old female presents with red target lesions confined to the hands and is diagnosed with erythema multiforme. Which of the following could be the cause?

- 1) Cytomegalovirus infection [0]
- 2) Ureaplasma urealyticum [0]
- 3) Group B Streptococci [0]
- 4) Langerhan's cells histiocytosis [0]
- 5) Penicillin V [100]

Potential causes of erythema multiforme include:

INFECTIONS:

viruses: herpes simplex 1 and 2, hepatitis B, EBV, enteroviruses.

small-agents: mycoplasma pneumoniae.

bacteria: Group A Streptococcus, eosinophilia.

other: mycobacterium TB, histoplasma, coccidioides.

NEOPLASIA:

leukaemia

lymphoma.

ANTIBIOTICS:

penicillins, sulphonamides, isoniazid, tetracycline.

ANTICONVULSANTS:

phenytoin, phenobarbitone, carbamazepine.

OTHER:

aspirin, radiation therapy, etoposide, NSAIDs, sunlight, pregnancy.

33- A 74-year-old man with a thirty year history of psoriasis presented with generalised erythroderma of 3 days duration. Examination reveals him to be shivering but otherwise is well. He was treated as an inpatient with emollients and attention to fluid replacement and temperature control but failed to improve after five days. What is the most appropriate next treatment?

- 1) Oral hydroxychloroquine [0]
- 2) Oral methotrexate [100]

- 3) Oral prednisolone [0]
- 4) Topical coal tar [0]
- 5) Topical dithranol [0]

Erythroderma is an emergency as patients are susceptible to profound dehydration, infection and hypothermia. Methotrexate would be the only correct treatment for someone with erythrodermic psoriasis. Steroids could lead to unstable pustular psoriasis and would not generally work. Hydroxychloroquine has little effect on psoriasis. Topical coal tar and dithranol are good treatments for chronic plaque psoriasis but are highly irritant and would make the erythroderma much more inflamed and deteriorate his condition.

Emergency Medicine

- 1- On discovering an unconscious patient in a pre-hospital environment:
- 1) Rapid assessment of the airway and breathing is our primary objective [0]
 - 2) Cross infection with Neisseria meningitidis may occur during CPR [0]
 - 3) Two effective rescue breaths should be given once apnoea is confirmed [0]
 - 4) On confirming an arrest, one minute of CPR should be performed before leaving the patient and getting help [0]
 - 5) On confirming an arrest, a ratio of 15 compressions to 2 ventilations should be adopted at all times [100]

Assessing the environment to see if it is safe to approach is the first priority when considering providing aid to an unconscious patient. You do not want to become a casualty yourself! CPR related infections are extremely rare, although Tuberculosis, HIV and Neisseria meningitidis have all been recorded. Once it has been confirmed that the patient is not breathing you must get help or alert the emergency services, even if this means leaving the patient (this is especially important in a pre hospital environment). However, if the patient is an infant or child, a victim of trauma, a near drowning or if drug or alcohol intoxication is likely, then one minute of CPR should be performed before going for help. The correct ratio of compressions to ventilations is 15:2 regardless of the number of rescuers present.

- 2- In adult basic life support the correct ratio of chest compressions to ventilations is:
- 1) 3 to 1 [0]
 - 2) 5 to 1 [0]
 - 3) 5 to 2 [0]
 - 4) 10 to 2 [0]
 - 5) 15 to 2 [100]

15 compressions to 2 breaths is the currently recommended ratio regardless of the number of rescuers performing basic life support.

3- A 72-year-old man presents with an episode of collapse. He has had two similar episodes recently, each lasting about one minute. Four years ago he suffered an anterior myocardial infarction.

On examination he was orientated and symptom-free with a regular pulse rate of 80 bpm, BP 140/80 mmHg and the apex beat was displaced to the left. There was an apical systolic murmur. There were no signs of trauma. ECG showed sinus rhythm, Q waves and ST segment elevation anteriorly without reciprocal depression.

What is the diagnosis?

- 1) acute anterior myocardial infarction [0]
- 2) cerebrovascular accident [0]
- 3) epileptic seizure [0]
- 4) pulmonary embolism [0]
- 5) ventricular tachycardia [100]

The ECG is suggestive of a left ventricular aneurysm, which has a tendency for both an malignant arrhythmogenic focus and also for left ventricular thrombus. The brief episode of loss of consciousness with no residual neurology makes the diagnosis for cerebral embolism unlikely. The story is more suggestive of a ventricular tachycardia and would suggest further investigations. Prolonged heart rhythm monitoring and an echo are recommended. If VT is proven then he should be on amiodarone and the indication for an automated implantable cardioverter/defibrillator strongly considered if the overall LV function is reduced.

4- A 45-year-old solicitor had an onset of severe, crushing, substernal chest pain while attending a football match. He collapsed on his way to the car. Bystander Cardiorespiratory Resuscitation was begun immediately and continued until arrival in Casualty where an endotracheal tube was inserted and ventilation was maintained on 100% oxygen.

Investigations revealed:

pH 7.13
PaO₂ 560 mmHg
PaCO₂ 18 mmHg
Bicarbonate 5.8
SaO₂ 98%

Based on these laboratory values, which of the following statements best describes his current pathophysiology?

- 1) He is demonstrating a primary respiratory alkalosis [0]
- 2) He probably developed a large right to left intracardiac shunt [0]
- 3) His anion gap is probably normal [0]
- 4) His oxyhemoglobin curve is shifted to the left [0]
- 5) His pulmonary artery pressure is probably elevated [100]

This young patient with severe central chest pain has probably arrested due to myocardial infarction and arrhythmia. His gases reveal high PO₂ following 100% O₂ but severe acidosis due to the arrest and lactic acidosis thus anion gap would be high.

He does not have a primary ventilatory failure as his PO₂ is high. There is no left to right shunting and high pulmonary pressures would be expected after this arrest scenario.

5- Which of the following concerning the use of intravenous bicarbonate in cardiorespiratory arrest is correct?

- 1) exacerbates intracellular acidosis [100]
- 2) has a positive inotropic effect on ischaemic myocardium [0]
- 3) improves oxygen release to the tissues [0]
- 4) increases cerebral blood flow [0]
- 5) reduces pre-existent hyperkalemia [0]

Has negative inotropic effect, reducing cerebral blood flow, shifts oxygen dissociation curve to the left inhibiting oxygen release to tissues.

6- A 19 year old woman became breathless while travelling on an aeroplane. Which one of the following features most strongly supports a diagnosis of acute hyperventilation related to a panic disorder?

- 1) Carpal spasm. [100]
- 2) Finger paraesthesiae. [0]
- 3) Hypotension. [0]
- 4) Light-headedness. [0]
- 5) Loss of consciousness [0]

We need to distinguish between the signs that may be expected in the tachypnoea associated with the hypoxia from a PE or any other serious respiratory problem and the hyperventilation with increased pO₂ in a panic attack. A carpal spasm would be most likely to reflect this. Finger paraesthesiae can occur with PE, as can hypotension, light-headedness and loss of consciousness. Carpal spasm is found in association with hyperventilation due to the respiratory alkalosis which results in a reduction in ionised calcium concentration.

7- A 59-year-old man who was active all his life develops sudden severe anterior chest pain that radiates to his back. Within minutes, he is unconscious. He has a history of hypertension, but a recent treadmill test had revealed no evidence of cardiac disease.

Which of the following do you suspect?

- 1) Acute viral myocarditis [0]
- 2) Group A streptococcal infection [0]
- 3) Pulmonary embolus [0]
- 4) Right middle cerebral artery embolus [0]
- 5) Tear in the aortic intima [100]

This gentleman has the hallmarks of the presentation of an aortic dissection. Dissection is associated with hypertension in 80% of cases. The pain described is typical, especially if the tear is in the ascending aorta (accounting for 60% of total dissections), as the right coronary cusp may be involved, mimicking an inferior

infarct. Aortic dissection is an important differential diagnosis of myocardial infarction. We know that this man is unlikely to have cardiac disease, given his negative exercise test.

8- An 18-year-old woman is admitted after taking drugs at a night-club. Which of the following features suggest she had taken Ecstasy (MDMA)?

- 1) A pyrexia of 40°C [100]
- 2) hypernatraemia [0]
- 3) hypokalaemia [0]
- 4) metabolic acidosis [0]
- 5) respiratory depression [0]

Hyponatraemia, tachycardia, hyperventilation and hyperthermia are features of the amphetamine MDMA abuse.

9- A 75 year old man was admitted after been found collapsed in a garden shed surrounded by a number of empty containers. On clinical examination the patient had small pupils, a heart rate of 50 beats per minute, and was frothing at the mouth. What is the most likely diagnosis?

- 1) Creosote poisoning. [0]
- 2) Glyphosate poisoning. [0]
- 3) Organophosphorus poisoning. [100]
- 4) Paraquat poisoning. [0]
- 5) Pyrethroid poisoning. [0]

The patient has cholinergic features with a relative bradycardia, small pupils and increased salivation. This is highly suggestive of organophosphorus poisoning which as an anticholinesterase inhibitor, thus prolonging the effects of acetylcholine. Paraquat is associated with nausea vomiting and diarrhoea with ulceration. Creosote is a petroleum based substance and would not have such an effect. Glyphosate herbicides produces nausea, vomiting and diarrhoea with a caustic effect in the mouth. Pyrethroid is an insecticide and poisoning is rare but associated with coma, convulsions and pulmonary oedema.

10- In malignant hyperpyrexia:

- 1) A mortality rate of 20% may be expected [0]
- 2) Elevation of serum creatine kinase and myoglobinuria is diagnostic [0]
- 3) Muscle biopsy may be histologically normal [100]
- 4) The only available specific treatment is sodium dantrolene, which has a neutral pH [0]
- 5) The predisposing gene is thought to be on chromosome 9 [0]

Malignant hyperpyrexia (MH) is characterised by increased temperature and muscle rigidity during anaesthesia, which results from abnormal skeletal muscle contraction and increased metabolism. The predisposing gene is thought to be on chromosome 19, close to the gene for the ryanodine / dihydropyridine receptor complex. Known triggering agents include the volatile anaesthetic agents and suxamethonium. Patients

show different sensitivity to the triggering agents and the reaction can be delayed by several hours. Intravenous dantrolene (up to 10mg/Kg) is the only available specific treatment. The solution has a pH of 9 to 10. The prognosis is good when the appropriate treatment is instigated early, mortality being <5% (prior to dantrolene the mortality was 80%). Serum creatine kinase elevation and myoglobinuria are suggestive but not diagnostic of MH. Myoglobin and creatine kinase are both known to increase after giving suxamethonium to normal patients. Contracture tests using caffeine and halothane are the investigations of choice. Muscle biopsies may appear histologically normal.

11- A 22-year-old man suffers a deep laceration to the forearm resulting in transection of the median nerve. Following this injury, the nerve will undergo which of the following pathological processes?

- 1) Chronic inflammation [0]
- 2) Coagulative necrosis [0]
- 3) Fibrinoid necrosis [0]
- 4) Segmental demyelination [0]
- 5) Wallerian degeneration [100]

Degeneration of the portion of the nerve distal to the injury. Segmental demyelination is a feature seen in axons in the central nervous system with multiple sclerosis.

12- Which of the following reactions is involved in the metabolism of paracetamol under normal conditions?

- 1) cytochrome p450 dependent oxidation [0]
- 2) hydrolysis [0]
- 3) conjugation to glucuronic acid [100]
- 4) conjugation to glutathione [0]
- 5) acetylation [0]

Paracetamol is conjugated to glucuronic acid and sulphate under normal conditions. In overdose these processes become saturated and the drug is then conjugated with glutathione. If the glutathione supply is depleted then a toxic metabolite is formed.

13- A 59-year-old man who was active all his life develops sudden severe anterior chest pain that radiates to his back. Within minutes, he is unconscious. He has a history of hypertension, but a recent treadmill test had revealed no evidence for cardiac disease. Which of the following is the most likely diagnosis?

- 1) Acute myocardial infarction [0]
- 2) Group A streptococcal infection [0]
- 3) Pulmonary embolus [0]
- 4) Right middle cerebral artery embolus [0]
- 5) Tear in the aortic intima [100]

The history is typical of aortic dissection. All the others could cause sudden collapse but not with acute chest pain radiating to the back in the presence of a recent normal exercise test. Acute MI is possible but not the most likely.

14- A 24 year old man presented twelve hours after an overdose of dihydrocodeine 1.2 g and paracetamol 30 g. He had pinpoint pupils, a Glasgow Coma Scale score of 14 and a blood pressure of 100/60 mmHg. Which one of the following is the most appropriate management?

- 1) 500ml of 10% glucose intravenously over four hours. [0]
- 2) Intravenous Flumazenil. [0]
- 3) Intravenous Naloxone. [0]
- 4) Intravenous N-acetylcysteine. [100]
- 5) Oral activated charcoal. [0]

This patient's GCS is reasonable and the opiate-like effects seem minimal (no evidence of respiratory depression). However, this patient has received a hefty dose of paracetamol conferring a high risk of hepatic toxicity. The 12 hour delay makes the absorptive effects of charcoal limited and although it would be useful as gastric emptying may be delayed it is not as important in this patient as the paracetamol antidote. Even though the paracetamol level is not provided, he should be treated with N-acetylcysteine without delay.

15- A 54-year old woman was admitted with acute breathlessness. On examination she had a temperature of 37.9°C, a respiratory rate of 32 breaths per minute, a pulse of 120 beats per minute, a blood pressure of 100/60 mmHg, and a peak expiratory flow rate of 250 litres per minute. Auscultation of the heart and chest was normal. The Chest X-ray was normal and blood gases on air showed: pH 7.35 (7.36 - 7.44)

PaO₂ 6.0

kPa (11.3 - 12.6)

PaCO₂ 3.9

kPa (4.7 - 6.0)

Serum bicarbonate 20 mmol/l (20 - 28)

She was started on high flow oxygen. What is the most important next treatment?

- 1) amoxycillin intravenously [0]
- 2) aminophylline intravenously [0]
- 3) intravenous fluids [0]
- 4) low molecular weight heparin [0]
- 5) nebulised salbutamol [100]

This patient has features of a severe acute asthma attack with Type 1 respiratory failure with mixed acid-base disturbances. Respiratory alkalosis is the commonest acid-base abnormality in acute asthma, but lactic acidosis in peripheral tissues may cause mixed acid-base disturbances. The British Thoracic guidelines suggest immediate treatment with high flow oxygen, nebulised salbutamol and corticosteroids. If there had been life-threatening features present (peak flow <33% predicted or best, silent chest, feeble respiratory effort, bradycardia, hypotension, exhaustion, confusion or coma), then add nebulised ipratropium and iv aminophylline or salbutamol. Although PE can cause low PaO₂, and normal or reduced PaCO₂, spirometry is usually normal or mildly reduced. Hence PE is less likely in this case.

16- A precordial thump:

- 1) Can be given following an unwitnessed cardiac arrest [0]
- 2) Should be administered after a warning has been given to the patient [0]
- 3) Can be delivered up to twice during a cardiac arrest [0]
- 4) Delivers approximately 10 Joules of energy [100]
- 5) Should be aimed at the position of V4 on the anterior chest wall [0]

The precise indication for performing a precordial thump is following a witnessed or monitored cardiac arrest. Warning a patient who has arrested will serve little purpose! Only one thump should be delivered (before the first 200J defibrillatory shock) over the lower third of the sternum. Approximately 7 to 10 Joules of energy is delivered with an appropriately weighted thump (potential energy to mechanical energy to electrical energy).

17- Which of the following would be expected to reduce maternal mortality when given in eclampsia?

- 1) Insulin and dextrose infusion [0]
- 2) Low dose dopamine infusion [0]
- 3) Magnesium infusion [100]
- 4) Phenytoin infusion [0]
- 5) Salbutamol infusion [0]

Magnesium has been shown to significantly reduce maternal mortality in eclampsia and a favourable outcome may also be expected in pre-eclampsia. None of the other agents has been associated with a reduced mortality in eclampsia.

18- Which of the following forms of pulmonary embolism is the commonest cause of secondary pulmonary hypertension?

- 1) Air embolism (Caisson's disease) [0]
- 2) Fat embolism [0]
- 3) Massive pulmonary embolism (e.g., saddle embolism) [0]
- 4) Multiple small recurrent pulmonary embolism [100]
- 5) Paradoxical embolism [0]

19- A 70 year old man was admitted with pallor, light-headedness and loss of energy. On the day prior to admission he had reported loose dark stools. Examination revealed a pulse of 90 per minute and a blood pressure of 110/70 mmHg. Investigations revealed:

Haemoglobin 7.2 g/dL (14-18)
 MCV 72 fL. (78-96)
 White cell count $11.3 \times 10^9/L$ (4-11)
 Platelet count $480 \times 10^9/L$ (150-400)

What is the most appropriate next step in his management?

- 1) Barium meal [0]
- 2) Blood transfusion [100]
- 3) Endoscopy [0]
- 4) Parenteral iron infusion [0]

5) Proton pump inhibitor therapy [0]

There is only one answer here and that is blood transfusion. He has clearly had a major GI bleed since he presents with symptoms of shock with a high resting heart rate and lowish blood pressure the day after what sounds like melaena. What is more he has a significant microcytic anaemia. He should be resuscitated with blood transfusion and then send for upper GI endoscopy. A barium meal will not help a bleeding vessel. Parenteral iron is for chronic anaemia not acute bleeds and proton pump inhibitors, although widely used, have no supportive evidence and are nowhere near as important as giving blood to this man.

20- Which of the following would be expected features of a LEFT Posterior cerebral artery occlusion :

- 1) a right homonymous hemianopia [100]
- 2) internuclear ophthalmoplegia [0]
- 3) Wernicke's aphasia [0]
- 4) pure aphasia (i.e. without alexia) [0]
- 5) decerebrate state [0]

b- typical of multiple sclerosis. c+d-Middle cerebral artery. e-False? Pontine lesion. Other possible findings in posterior left cerebral artery occlusion: cortical blindness, visual hallucinations, thalamic syndrome, Claude's and Weber's syndromes.

21- A 74-year-old man with a thirty year history of psoriasis presented with generalised erythroderma of 3 days duration. Examination reveals him to be shivering but otherwise is well. He was treated as an inpatient with emollients and attention to fluid replacement and temperature control but failed to improve after five days. What is the most appropriate next treatment?

- 1) Oral hydroxychloroquine [0]
- 2) Oral methotrexate [100]
- 3) Oral prednisolone [0]
- 4) Topical coal tar [0]
- 5) Topical dithranol [0]

Erythroderma is an emergency as patients are susceptible to profound dehydration, infection and hypothermia. Methotrexate would be the only correct treatment for someone with erythrodermic psoriasis. Steroids could lead to unstable pustular psoriasis and would not generally work. Hydroxychloroquine has little effect on psoriasis. Topical coal tar and dithranol are good treatments for chronic plaque psoriasis but are highly irritant and would make the erythroderma much more inflamed and deteriorate his condition.

22- Intraosseous cannulation for the infusion of fluids and drugs:

- 1) Is a technique frequently performed on paediatric and adult patients [0]
- 2) Should be considered when attempts at gaining peripheral venous access are prolonged [100]

- 3) In the presence of limb bone fractures, the intraosseous cannula should be inserted at the fracture site [0]
- 4) Is rarely indicated during a paediatric cardiac arrest [0]
- 5) In the tibia an intraosseous cannula should be inserted in the midline at the level of the tibial tuberosity [0]

First used in the 1930s as an alternative method of gaining vascular access, intraosseous cannulation is currently recommended during life threatening situations when vascular access is required quickly. Therefore, when attempts at gaining venous access fail or are delayed, intraosseous cannulation should be considered. In paediatric cardiac arrest it is the recommended technique for gaining circulatory access. Many potential anatomical sites for intraosseous cannulation have been described, including the lower and upper limbs and sternum. The correct site on the proximal tibia is 2 to 3 cm below the tibial tuberosity on the antero-medial surface. Fracture sites should be avoided, as should limbs with proximal fractures.

23- A 2 week old male child is brought to casualty by his concerned parents with diarrhoea and vomiting. He is the first child of a young couple. Examination reveals few features besides obvious dehydration. He is noted to have a penile length of 3.5cms. Which of the following is the most appropriate initial treatment for this patient?

- 1) Cow's milk allergy is the most likely diagnosis [0]
- 2) gluten-enteropathy should be excluded [0]
- 3) Requires urgent treatment with oral steroids [0]
- 4) Requires urgent treatment with IV normal saline [100]
- 5) Rota virus gastroenteritis is the most likely diagnosis [0]

The history suggests a diagnosis of classical congenital adrenal hyperplasia which is commonly due to 21 hydroxylase deficiency. A variable presentation is typical but neonatal presentations include salt losing crisis, penile development in the male virilisation and ambiguous genitalia in females. Patients should initially be resuscitated with fluid, usually saline and if suspicious, urgent biochemistry requested for cortisol, 17OHP etc prior to administration of intravenous steroids.

24- In most cardiac arrest situations 1mg of adrenaline (epinephrine) is given intravenously every 3 minutes. What is the correct volume and concentration of the adrenaline?

- 1) 0.1ml of 1 in 100 [0]
- 2) 1ml of 1 in 1000 [0]
- 3) 10ml of 1 in 1000 [0]
- 4) 1ml of 1 in 10,000 [0]
- 5) 10ml of 1 in 10,000 [100]

A 1mg dose of adrenaline (epinephrine) would be administered with answers A, B and E. However, 10 ml is considered the optimum volume of adrenaline during cardiac arrest.

25- A 26-year-old woman presented in acute shock at 35 weeks of pregnancy with profuse vaginal bleeding. She had suffered two previous miscarriages. She had a pulse of 110 beats per minute, blood pressure of 110/84 mmHg and no foetal heart sounds were audible.

Investigations revealed:

haemoglobin concentration 9.5g/dL (11.5 – 16.5)
platelet count 66 X 10⁹/L (150 – 400)
prothrombin time 21 s (11.5 – 15.5)
activated partial thromboplastin time (APTT) 52 s (30 – 40)
fibrinogen concentration 0.5 g/L (2 – 4)

What is the most appropriate next step in management?

- 1) antithrombin III infusion [0]
- 2) fibrinogen replacement infusion (cryoprecipitate) [100]
- 3) intravenous heparin [0]
- 4) platelet transfusion [0]
- 5) transfusion of two units group O Rhesus D negative blood [0]

The clinical picture is disseminated intravascular coagulation. When bleeding is the major problem, the aim is to maintain the prothrombin and activated thromboplastin time at a ratio of 1.5 times of the control and the fibrinogen level above 1g/L. Platelet transfusion is recommended if the count is less than 50 X 10⁹ /L. Anaemia is not very severe so in this case fibrinogen replacement would be the appropriate choice. (Ref: Oxford textbook of Medicine)

26- A youth worker, aged 40, presents to Accident and Emergency with vomiting. On detailed questioning, he admits to having taken 36 paracetamol tablets 2 hours previously. He is vomiting profusely with a BP of 90/60. Which of the following measures would be most appropriate?

- 1) Paracetamol levels [0]
- 2) oral methionone [0]
- 3) IV N-acetyl cysteine [0]
- 4) IV fluids [100]
- 5) Coagulation screen [0]

The most pressing issue in this patient is resuscitation as he is vomiting and hypotensive. It is too early to carry out paracetamol levels as these should be carried out at 4 hours, and certainly too early to instigate treatment with NAC or methionine. An INR gives an indication of hepatocellular damage and again this will not be seen at presentation of paracetamol overdose.

27- A 30-year-old man presents with a history of transient loss of consciousness and palpitations. His ECG shows ventricular tachycardia.

Which of the following treatments should be avoided?

- 1) adenosine [0]
- 2) amiodarone [0]

- 3) DC cardioversion [0]
- 4) flecainide [0]
- 5) verapamil [100]

If there were 'killer' questions (questions that if a candidate got wrong they would certainly fail the exam) in the MRCP exam then this would be one of them. Verapamil should be avoided in cases of VT because it can cause a catastrophic fall in blood pressure. Adenosine is useful diagnostically when the diagnosis of regular wide complex tachycardia is in doubt. Amiodarone is a useful antiarrhythmic agent though its use acutely is limited by its irritant nature on veins. DC Cardioversion is probably the treatment of choice in this case. Flecainide is a good antiarrhythmic and would be indicated in patients without LV failure (it is associated with an increased risk of death in such cases). Flecainide is widely used for atrial fibrillation.

28- Which of the following statements concerning the treatment of acute myocardial infarction is correct?

- 1) A pansystolic murmur developing within the first 24 hours does not require further investigation. [0]
- 2) Dipyridamole therapy reduces reinfarction within the first year. [0]
- 3) Heparin is beneficial if given with streptokinase. [0]
- 4) Prophylactic lignocaine given in the first 48 hours is effective in preventing ventricular fibrillation [0]
- 5) Treatment with a dihydropyridine calcium antagonist is associated with increased cardiovascular mortality. [100]

GISSI II revealed no survival advantage of heparin plus streptokinase in acute MI compared with strep alone. ISIS II revealed that dihydropyridine calcium antagonists were associated with increased cardiovascular risk after MI. Dipyridamole does not reduce risk. A newly discovered pansystolic murmur may signify acquired MR or VSD.

29- A 70 year old female is admitted 12 hours after taking an overdose of aspirin. Investigations revealed: Serum sodium 138 mmol/L (137-144), Serum potassium 5.9 mmol/L (3.5-4.9), Serum bicarbonate 14 mmol/L (20-28), Serum urea 18.1 mmol/L (2.5-7.5), Serum creatinine 238 umol/L (60-110), Serum salicylate 1120 mg/L (8 mmol/L). What is the most appropriate treatment of this patient?

- 1) Haemodialysis [100]
- 2) Haemofiltration [0]
- 3) Intravenous sodium bicarbonate. [0]
- 4) Peritoneal dialysis. [0]
- 5) Urine alkalinization. [0]

This patient is at major risk of aspirin toxicity as reflected by the excessive aspirin concentration and appears to have developed acute renal failure –is acidotic with an elevated potassium. Bicarbonate is recommended as a supportive therapy but in this patient, Haemodialysis is the treatment of choice. The latter is advised when the plasma-salicylate concentration is greater than 700 mg/litre (5.1 mmol/litre) or in the

presence of severe metabolic acidosis as recommended within the BNF poisons section.

30- A 60-year-old man presents with an episode of memory loss. Three days earlier he had become confused. His wife led him into the house - he apparently sat down at her request, and had a cup of tea. He then wandered around the house, confused, but remained conscious and able to have some conversation with his wife, though continuing to ask similar questions repeatedly. After three hours, he abruptly returned to normal and had no recollection of the events. What is the most likely diagnosis?

- 1) alcohol related amnesia [0]
- 2) chronic subdural haematoma [0]
- 3) complex partial status epilepticus [0]
- 4) hysterical fugue state [0]
- 5) transient global amnesia [100]

This is the typical clinical description of transient global amnesia which represent a transient vascular insufficiency of both hippocampi.

31- A 76-year-old with a recent history of cerebral haemorrhage is admitted with a cough, worsening breathlessness and right pleuritic chest pain. He is also mildly pyrexial. His ventilation-perfusion scan reveals several areas of ventilation/perfusion mismatches. What is the most appropriate line of management?

- 1) aspirin therapy [0]
- 2) antibiotics [0]
- 3) inferior vena cava filter [100]
- 4) low molecular weight heparin treatment [0]
- 5) warfarin treatment [0]

This patient has PE following a recent haemorrhagic stroke. The risk of rebleeding into the stroke area is too high with anticoagulation. The best action would be percutaneous insertion of IVC filter which may be as effective as anticoagulation. It is used in cases where anticoagulation is a contraindicated or in those in whom anticoagulation alone fails.

32- A 44 year old male with Child's grade C cirrhosis presented with haematemesis. Which one of the following drugs, administered intravenously, would be the most appropriate, immediate, treatment?

- 1) Isosorbide dinitrate. [0]
- 2) Omeprazole. [0]
- 3) Propranolol [0]
- 4) Somatostatin [100]
- 5) Tranexamic acid. [0]

The suggestion is that this patient is at particularly high risk of oesophageal varices. Child's classification of cirrhosis is a points scale based upon ascites/bilirubin etc reflecting prognosis. Graded depending upon the points scored from A-C with C reflecting greatest risk. Somatostatin acts to reduce portal pressures and has been

demonstrated to be as effective as endoscopy at controlling variceal bleeding in the acute setting. Beta-blockers can be used as oral prophylaxis for oesophageal varices. IV Omeprazole has also been shown to be effective in reducing mortality in GI haemorrhage of any cause (NEJM 2002) but somatostatin may be expected to be superior for the above patient.

33- A 16 year old girl with obesity was referred with abdominal swelling and mild ankle oedema. On examination the blood pressure was 140/90 mmHg. Investigations revealed: Haemoglobin 10.5g/dL (11.5-16.5), Serum biochemistry normal, Serum albumin 34 g/L (37-49), Urine dipstick proteinuria + Which investigation should be performed next?

- 1) 24 hour urinary protein estimation. [0]
- 2) Abdominal ultrasound. [0]
- 3) Plasma protein electrophoresis. [0]
- 4) Urinary albumin: creatinine ratio. [0]
- 5) Urinary B-human chorionic gonadotrophin test (B-HCG) [100]

This young girl has been 'gaining weight', has abdominal swelling and ankle oedema. She is hypertensive and has a mild anaemia with proteinuria. These signs should 'ring a bell' suggesting a concealed pregnancy with pre-eclampsia. The most relevant investigation would be a pregnancy test – urinary B-HCG.

34- A 38 year old female presents with red target lesions confined to the hands and is diagnosed with erythema multiforme. Which of the following could be the cause?

- 1) Cytomegalovirus infection [0]
- 2) Ureaplasma urealyticum [0]
- 3) Group B Streptococci [0]
- 4) Langerhan's cells histiocytosis [0]
- 5) Penicillin V [100]

Potential causes of erythema multiforme include:

INFECTIONS:

viruses: herpes simplex 1 and 2, hepatitis B, EBV, enteroviruses.

small-agents: mycoplasma pneumoniae.

bacteria: Group A Streptococcus, eosin.

other: mycobacterium TB, histoplasma, coccidioides.

NEOPLASIA:

leukaemia

lymphoma.

ANTIBIOTICS:

penicillins, sulphonamides, isoniazid, tetracycline.

ANTICONVULSANTS:

phenytoin, phenobarbitone, carbamazepine.

OTHER:

aspirin, radiation therapy, etoposide, NSAIDs, sunlight, pregnancy.

35- Which of the following is currently recommended as the drug of choice in treating refractory ventricular fibrillation or pulseless ventricular tachycardia?

- 1) Adenosine [0]
- 2) Amiodarone [100]
- 3) Bretyllium [0]
- 4) Lignocaine [0]
- 5) Magnesium [0]

300mg of amiodarone made up to 20ml with 5% dextrose given as an intravenous bolus is the drug of choice. 100mg of lidocaine may be given intravenously when amiodarone is unavailable. Historically 5mg / Kg of Bretyllium was given, but it is no longer recommended.

36- A 19-year-old girl presents with an overdose of Paracetamol. Which of the following statements is correct?

- 1) Acetylcystine should routinely be given if the presentation is within the first 12 hours of overdose. [0]
- 2) Because she is over the age of 6, she is unlikely to develop significant toxicity. [0]
- 3) Liver function tests should be monitored. [100]
- 4) The mortality in those with an AST of >350 IU/L is 4%. [0]
- 5) Hospitalisation will be needed for at least 5 days. [0]

Treatment with N-acetyl cysteine (NAC) is given according to a standard nomogram. NAC may be useful up to 36 hours following ingestion. Children under the age of 6 are unlikely to develop significant toxicity, but adolescents have a higher incidence of toxic plasma levels following ingestion, and a higher incidence of abnormal AST >1000/U/L. Even after serious hepatotoxicity, the mortality rate is under 0.5%. The occasional patient may require liver transplantation.

37- A 22 year old woman complains of haemoptysis, abdominal pains and pyrexia for a month.

She is admitted to hospital and found to be afebrile and not distressed. There are numerous crusted, linear lesions on her forearms.

What is the most likely diagnosis?

- 1) Acute intermittent Porphyria [0]
- 2) Factitious disorder [100]
- 3) Systemic lupus erythematosus [0]
- 4) TB [0]
- 5) Wegener's granulomatosis [0]

The history is very vague and the patient has no clinical features other than a rash which sounds typical of dermatitis artefacta.

38- A 63 year old female presents with a one day history of confusion with headaches. On examination she is confused, with a Glasgow Coma Scale of 13 and a temperature of 39.5. She has nuchal rigidity and photophobia. CSF examination reveals a glucose

of 0.5 mmol/l, a white cell count of 2500 per mm and Gram positive Cocci in pairs. Which of the following is correct?

- 1) The most likely infective organism is Staphylococcus Aureus [0]
- 2) The organism is likely to be penicillin resistant. [0]
- 3) Rifampicin should be given to close contacts. [0]
- 4) Nerve deafness would be a common complication in this case. [100]
- 5) A characteristic rash would be expected. [0]

This patient has pneumococcal meningitis, caused by the Gram positive coccus Strep Pneumonia. This is the commonest cause of bacterial meningitis and is associated with the highest mortality (20%) and highest morbidity, such as deafness which may occur in 50%. Contacts do not require treatment and there is no rash associated with pneumococcal meningitis.

39- Which ONE of the following is true regarding acute pulmonary embolism?

- 1) a normal ECG excludes the diagnosis [0]
- 2) embolectomy is more effective than thrombolysis in improving survival [0]
- 3) Heparin is as effective as thrombolytic therapy [0]
- 4) the presence of hypoxaemia is an indication for thrombolysis [0]
- 5) thrombolysis administered through a peripheral vein is as effective as through a pulmonary artery catheter [100]

Embolectomies are rarely done nowadays due to the excellent results with thrombolysis. Thrombolytic therapy is reserved for those with severely compromised circulation (equally effective through peripheral vein or via catheter in pulmonary artery). Heparin reduces risk of further embolism (anticoagulant) and reduces pulmonary vasoconstriction.

40- A 30-year-old man presents to the Accident and Emergency Department with a history of drug overdose. He is known to be repeatedly admitted with similar episodes of self-harm. On this occasion he is drowsy and has prominent hypersalivation. Which of the following agents, found on his person, is the likely cause?

- 1) Chlormethiazole [100]
- 2) Cocaine [0]
- 3) Dothiepin [0]
- 4) L-dopa [0]
- 5) Solvent cannister [0]

Hypersalivation is seen with parasympathomimetic agenets, insecticides, arsenic, strychnine, chlormethiazole and clozapine and others. Solvent abuse may cause an acneiform rash around the buccal cavity. Cocaine abuse leads to hypertension and nasal septum perforation. The other agents are anticholinergic and would cause dry mouth in overdose.

41- In considering the management of convulsions select the correct statement from the list below.

- 1) If the fit lasts longer than 5 minutes, then PR diazepam should be given. [0]

- 2) Phenobarbitone is a useful therapy in school age children. [0]
- 3) Paraldehyde is best given intramuscularly. [0]
- 4) Hypoglycaemia should always be considered. [100]
- 5) When associated with fever, antibiotics should always be given to cover the possibility of meningitis. [0]

Status epilepticus is defined as continuous convulsion lasting greater than 30 minutes, or the occurrence of serial convulsions between which there is no return of consciousness. It may be generalised (tonic clonic, absent) or partial (simple, complex, or with secondary generalisation). Generalised tonic clonic seizures predominate. There are 3 major sub-types:

Prolonged febrile seizures.

Idiopathic status epilepticus (no underlying CNS lesion or insult).

Symptomatic (long-standing neurological disorder or metabolic abnormality).

The commonest cause in a child less than 3 years is a prolonged febrile seizure. Sleep deprivation and drug withdrawal can also precipitate it. The relationship between neurological outcome and duration of status epilepticus is unknown in children and adults. In the animal model, 60 minutes of constant seizure activity is associated with pathological changes, even when metabolic homeostasis is maintained. Cell death thus results in increased metabolic demands from continually discharging neurones. Vulnerable areas include the hippocampus, the mid to low cerebellum, middle cortical areas, and thalamus. Approximately, 20 minutes of status epilepticus produces regional oxygen sufficiency promoting cell damage and necrosis. This is, therefore, used as the threshold in children. Initial management begins with ABC.

Hypoglycaemia should be excluded (if present 5ml/kg of 10% dextrose is given by IV infusion), and blood obtained for full blood count, electrolytes including calcium and magnesium, glucose, creatinine, anticonvulsant levels. Blood and urine may be obtained for toxicology. Arterial blood gases should be done, and consideration given to lumbar puncture.

First line anticonvulsant therapy would be diazepam given IV if possible. If seizures persist then phenytoin may be given as a loading dose followed by an infusion. Phenobarbitone may be used as first line in infants. Paraldehyde can be given as a dilute solution intravenously, or administered rectally or IM. The latter 2 routes can produce tissue damage and sloughing, so these should be reserved for exceptional circumstances.

Endocrine

1- Which of the following is a characteristic feature of familial hypercholesterolaemia?

- 1) Autosomal dominant inheritance [100]
- 2) elevated chylomicrons [0]
- 3) hypertriglyceridaemia [0]
- 4) increased expression of LDL receptors [0]
- 5) Palmar xanthomas [0]

Familial hypercholesterolaemia is an autosomal dominant condition manifest by increased LDL concentrations (not chylomicrons) due to constitutional abnormalities and reduced numbers of the LDL receptor. Hypertriglyceridaemia is not characteristic and HDL concentrations are usually decreased. Tendon xanthomata are characteristic and the condition is associated with a premature cardiovascular mortality.

2- A 55 year old female undergoes a DEXA scan which reveals a bone mineral density T score of -2.5 at the hip and lumbar spine. Which of the following may contribute to such a result?

- 1) Diabetes mellitus [100]
- 2) Delayed menopause [0]
- 3) Hypothyroidism [0]
- 4) Obesity [0]
- 5) Myeloma [0]

This patient has osteoporosis as defined by her abnormally low T score. Endocrine diseases associated with osteoporosis are Cushing's disease, diabetes mellitus, thyrotoxicosis, hypogonadism and acromegaly. Other associates include rheumatoid arthritis, renal failure, corticosteroids, early menopause, slender habitus, smoking, lack of exercise, family history, age/sex and excess alcohol.

3- A 32 year-old woman presents with a one year history of secondary amenorrhoea. She had been prescribed temazepam and dihydrocodeine. On examination she had galactorrhoea. Her serum prolactin was noted to be 6000 mU/l (<450 mU/l). What is the most likely diagnosis?

- 1) Drug-induced hyperprolactinaemia [0]
- 2) Hypothyroidism [0]
- 3) Pituitary dependent Cushing's disease [0]
- 4) Pituitary microadenoma [100]
- 5) Stress [0]

The patient has amenorrhoea, galactorrhoea and a grossly elevated prolactin concentration of 6000. The diagnosis is likely to be a prolactinoma most likely due to a pituitary microadenoma (microprolactinoma). These drugs would not cause hyperprolactinaemia – drugs that are responsible include dopamine antagonists – Antipsychotics (Haloperidol, Sulpiride), metoclopramide, Domperidone and SSRIs to a lesser extent. There is nothing in this patient's history to suggest either hypothyroidism or Cushing's.

Hypothyroidism may cause hyperprolactinaemia but is usually mild. Stress would not produce such a picture.

4- Which of the following is most likely to be associated with the development of gynaecomastia?

- 1) Congenital adrenal hyperplasia [0]
- 2) Prolactinoma [0]
- 3) Hypopituitarism [0]

- 4) Hypothyroidism [0]
- 5) Seminoma [100]

Gynaecomastia is due to a perturbation in the testosterone to oestradiol ratio. Neither hyperprolactinaemia nor hypopituitarism disturb this ratio and are rarely associated with gynaecomastia. Unlike hyperthyroidism, hypothyroidism is not a cause. CAH is not a cause. However, gynaecomastia may be a presenting symptom of a seminoma and may arise due to HCG secretion.

5- Causes of hypoadrenalism include:

- 1) Hughes' syndrome (anti-phospholipid antibody) [100]
- 2) MEN type 2a [0]
- 3) VonHippel-Lindau [0]
- 4) Penderd's syndrome [0]
- 5) McArdle's syndrome [0]

The anti-phospholipid syndrome is one of the commoner causes of Hypoadrenalism and may precipitate adrenal infarction and haemorrhage through adrenal vein thrombosis.

6- Which of the following is a glycoprotein hormone?

- 1) Growth hormone releasing hormone [0]
- 2) Cortisol [0]
- 3) Thyrotropin releasing hormone (TRH) [0]
- 4) Thyrotropin (TSH) [100]
- 5) Oxytocin [0]

Thyrotropin is glycosylated, cortisol is a steroid hormone and the others are peptide hormones/neuropeptides which as a group are rarely glycosylated.

7- Which of the following is a likely presenting feature of Cushing's syndrome

- 1) Lichen planus [0]
- 2) Mononeuritis multiplex [0]
- 3) Polymyositis [0]
- 4) Necrosis of the femoral head [100]
- 5) Diabetes insipidus [0]

Cases of Cushing's Syndrome have presented with necrosis of the femoral head due to osteoporosis. Diabetes insipidus would be very unusual, whereas diabetes mellitus may occur in 30%. Lichen planus is treated with corticosteroids, as is polymyositis. Mononeuritis multiplex is not a feature.

8- A 20 year old man with asthma was found to be hypertensive. Investigations revealed: Serum sodium 144 mmol/L (137-144), Serum potassium 2.4 mmol/L (3.5-4.9), Serum bicarbonate 30 mmol/L (20-28). Which one of the following is the most likely diagnosis?

- 1) Bartter's syndrome [0]
- 2) Coarctation of the aorta [100]
- 3) Congenital Adrenal Hyperplasia [0]
- 4) Conn's Syndrome [0]
- 5) Inhaled Salbutamol therapy [0]

This is a tough question as a number of answers are possible. This young asthmatic has a hypokalaemic hypertension and I'm assuming that his hypertension is sustained. This would therefore suggest a secondary cause which may be either hyperaldosteronism or pseudohyperaldosteronism. A rare CAH (11-beta hydroxysteroid dehydrogenase (11-BHSD) deficiency) may be responsible for hypokalaemic hypertension and the presentation is variable ranging from birth to adulthood. Bartter's syndrome is not associated with hypertension. Conn's syndrome is usually found in middle aged patients and would be rather unlikely in a patient of this age. Liquorice ingestion could again fit this picture but would again be somewhat unusual in this patient. Salbutamol may cause hypokalaemia particularly when given via nebuliser or particularly iv but should not produce hypertension.

9- A 19 year old woman became breathless while travelling on an aeroplane. Which one of the following features most strongly supports a diagnosis of acute hyperventilation related to a panic disorder?

- 1) Carpal spasm. [100]
- 2) Finger paraesthesiae. [0]
- 3) Hypotension. [0]
- 4) Light-headedness. [0]
- 5) Loss of consciousness [0]

We need to distinguish between the signs that may be expected in the tachypnoea associated with the hypoxia from a PE or any other serious respiratory problem and the hyperventilation with increased pO₂ in a panic attack. A carpal spasm would be most likely to reflect this. Finger paraesthesiae can occur with PE, as can hypotension, light-headedness and loss of consciousness. Carpal spasm is found in association with hyperventilation due to the respiratory alkalosis which results in a reduction in ionised calcium concentration.

10- A 32 year old female presents with a 4 month history of amenorrhoea. She takes no specific therapy. She has two children and her husband has has a vasectomy. Examination reveals an obese individual but no other abnormality. Investigations reveal an oestradiol concentration of 100 pmol/l (NR 130 - 500), an LH of 2.1 mU/l (NR 3.0 - 6.6), an FSH of 2.2 mU/l (NR 3.3 - 10.1), a prolactin concentration of 800 mU/l (NR 50 - 500 mU/l) and a testosterone concentration of 2.1 pmol/l (NR less than 3 pmol/l). Which investigation is the most appropriate?

- 1) Insulin tolerance test [0]
- 2) A Pregnancy test [0]
- 3) 17 hydroxy-progesterone [0]
- 4) Urine free cortisol concentration [0]
- 5) A MRI of the pituitary [100]

This patient has hypogonadotrophic hypogonadism as evidenced by suppressed LH/FSH and a low oestradiol concentration. This would exclude pregnancy as a cause and polycystic ovarian syndrome is also unlikely. In the presence of a raised prolactin concentration, a microprolactinoma would be the most likely explanation for this patient's symptoms and results. This may be demonstrated by a pituitary MRI scan. An insulin tolerance test would usually be entirely normal in a microprolactinoma.

11- Side effects of recombinant human growth hormone therapy include:

- 1) Proliferative retinopathy [0]
- 2) Aplastic anaemia [0]
- 3) Leukaemia [0]
- 4) Creutzfeldt-Jacob disease [0]
- 5) Benign Intracranial hypertension [100]

Unlike the old pituitary derived GH, rhGH is not associated with CJD as it is manufactured by recombinant techniques. rhGH therapy has been associated with BIH probably due to the fluid retention associated with GH therapy.

12- With which of the following is hyperprolactinaemia associated?

- 1) Cabergoline therapy [0]
- 2) Depression [0]
- 3) Fluoxetine therapy [100]
- 4) Hyperthyroidism [0]
- 5) Sheehan's syndrome [0]

Hyperprolactinaemia may be manifest by a milky discharge from the breasts. Causes include, prolactinoma, hypothyroidism (far increased TRH), Non-functional tumour with stalk compression and drugs in particular dopamine antagonists such as chlorpromazine, haloperidol and domperidone. Pregnancy is a particularly common cause of hyperprolactinaemia. Other drugs that are occasionally reported include SSRIs. PCOs is often associated with idiopathic hyperprolactinaemia.

13- A 23 year old female presents with weight gain and a 4 month history of amenorrhoea. Examination reveals a BMI of 33 and mild hirsutism. Relevant investigations reveal an oestradiol concentration of 1200 pmol/l (NR 130 - 800 pmol/l), a testosterone concentration of 2.8 nmol/l (NR less than 3 nmol/l), a prolactin concentration of 1500 mU/l (NR 50 - 450 mU/l), an LH of 1.2 u/l (NR 1.2 - 8 u/l) and a FSH of 1.5 u/l (NR 1.5 - 8 u/l). What is the most likely diagnosis:

- 1) Polycystic ovarian syndrome [0]
- 2) Prolactinoma [0]
- 3) Pregnancy [100]
- 4) Ovarian tumour [0]
- 5) Cushing's syndrome [0]

The patient has elevated oestradiol with suppressed LH/FSH and an elevated prolactin concentration. With the recent amenorrhoea the most likely diagnosis is pregnancy. A prolactinoma would cause hypogonadotrophic hypogonadism as would Cushing's

syndrome. In PCOs, neither prolactin or Oestradiol would not be this high and the LH to FSH ratio would classically be elevated.

14- Which ONE of the following is a recognised feature of achondroplasia?

- 1) Autosomal recessive inheritance [0]
- 2) May be diagnosed radiologically at birth [100]
- 3) Increased liability to pathological fractures [0]
- 4) Shortened spine [0]
- 5) Subfertility [0]

ACHONDROPLASIA is an autosomal dominant condition and one of the commonest forms of inherited dwarfism. Epiphyseal dysplasia - thin zone of cartilage cells, diminished columnar arrangement short thick bones, spinal length almost always normal. Features - short limbs, normal trunk, large head, saddle nose, exaggerated lumbar lordosis normal mental and sexual development, spinal problems. Homozygotes - neonatal death (Harrisons)

15- Which of the following is true of IGF-1 concentrations

- 1) Concentrations are reduced in pregnancy [0]
- 2) Concentrations are elevated in hepatic cirrhosis [0]
- 3) Concentrations are usually elevated in adult growth hormone deficiency [0]
- 4) Concentrations are reduced in starvation [100]
- 5) Concentrations are elevated in diabetes mellitus [0]

IGF-1 concentrations are often increased in pregnancy. Reduced IGF-1 is typically found in adult GHD, Cirrhosis of the liver due to reduced synthesis, diabetes mellitus and starvation.

16- Which of the following may be responsible for a hypokalaemic hypertension

- 1) Non-classical congenital adrenal hyperplasia [0]
- 2) Barter's syndrome [0]
- 3) Diabetic nephropathy [0]
- 4) Liddle's syndrome [100]
- 5) Type IV renal tubular acidosis [0]

Liddle's syndrome is typically associated with hypokalaemic hypertension and low renin and aldosterone concentrations - the so called pseudo-hyperaldosteronism. Barter's syndrome is associated with hypokalaemia though hypertension is not a feature. In type IV RTA, there is a hyporeninaemic hypoaldosteronism, which may also be produced with diabetic nephropathy. Hence hyperkalaemia is more typical.

17- Which of the following is true concerning oral hypoglycaemic agents?

- 1) Acarbose promotes insulin secretion in response to meals [0]
- 2) Chlorpropamide induces liver enzymes [0]
- 3) Glibenclamide is excreted unchanged by the kidney [0]
- 4) Gliclazide inhibits gluconeogenesis [0]
- 5) Metformin inhibits hepatic gluconeogenesis [100]

Chlorpropamide like all the other sulphonylureas stimulate pancreatic insulin secretion. They undergo hepatic metabolism then renal excretion. Acarbose is an alpha glucosidase inhibitor which inhibits the splitting of disaccharides into glucose and so inhibits glucose absorption from the gut. Metformin is an insulin sensitiser and although its actions are not fully understood its main role appears to be through inhibition of hepatic gluconeogenesis.

18- A 19 year-old female is referred following a visit to the dentist where marked erosion of her teeth was noted. She was entirely asymptomatic and her only medication was the oral contraceptive pill. On examination her blood pressure was 110/70 mmHg and her body mass index was 21.5 kg/m² (18 - 25).

Investigations

sodium 135 mmol/l
potassium 2.1 mmol/l
bicarbonate 42 mmol/l
urea 2.6 mmol/L
corrected calcium 2.08 mmol/
alkaline phosphatase 201 iu/l (50-110)

What is the most likely diagnosis?

- 1) Bulimia nervosa [0]
- 2) Conn's syndrome [0]
- 3) Laxative abuse [0]
- 4) Pregnancy [0]
- 5) Primary hypoparathyroidism [100]

This patient has tooth erosion associated with hypokalaemic metabolic alkalosis and hypocalcaemia. This suggests a diagnosis of hypoparathyroidism. Conn's is unlikely in this age group, is not associated with tooth erosion and hypertension would be expected. Bulimia like laxative abuse would be associated with hypokalaemia but the hypocalcaemia with raised alkaline phosphatase would not be expected. Early pregnancy would not fit this picture.

19- A 36-year-old male with insulin-dependent diabetes mellitus of three years duration presented with decreased libido and erectile dysfunction since diagnosis. No abnormalities were noted on genital examination. Investigations revealed:

plasma testosterone 6.0 nmol/L (9 - 35)
plasma follicle stimulating hormone 1.0 u/L (1-8)

Which of the following investigations is most appropriate next step?

- 1) autonomic function testing [0]
- 2) Doppler studies of penile artery [0]
- 3) Nerve conduction studies [0]
- 4) Serum ferritin [100]

5) Serum prolactin [0]

This IDDM patient appears to have hypogonadotrophic hypogonadism (HH) as reflected by low testosterone and low FSH. The combination is compatible with a diagnosis of haemochromatosis and measuring ferritin would be a reasonable investigation. Haemochromatosis typically causes hypogonadotrophic hypogonadism as a consequence of the ferritin deposition within the pituitary rather than primary testicular dysfunction. Autonomic nerve dysfunction is one of the commoner causes of impotence in a diabetic but in this case is not the cause of his HH. For similar reasons, both nerve conduction studies and dopplers are irrelevant. Prolactin would be a sensible measurement but probably if you were looking to confirm a diagnosis that incorporates the diabetes as well, Ferritin would be the investigation of choice.

20- Which of the findings listed below is true of Acromegaly?

- 1) A random growth hormone concentration may be diagnostically useful. [0]
- 2) It is unusual for the pituitary fossa to be enlarged. [0]
- 3) Pituitary hormones other than growth hormone are rarely affected. [0]
- 4) The majority of patients demonstrate an abnormal glucose tolerance test. [100]
- 5) Growth hormone concentrations are suppressed to normal by bromocriptine therapy. [0]

Random GH concentrations are pretty useless in the diagnosis of acromegaly which depends upon non-suppression of GH in the Oral Glucose tolerance test in which approx 50% have either impaired GTT or diabetes. GH concentrations seldom suppress to normal with bromocriptine but often respond far better with Octreotide. C is awkward but prolactin is often elevated (30%) although hypopituitarism would be unusual unless the tumour is particularly large. Usually at presentation the fossa is enlarged (about 80%).

21- A 16 year old male with a day history of malaise, weakness and vomiting. He was diagnosed with Insulin dependent diabetes mellitus 3 years previously. Which ONE of the following supports a diagnosis of diabetic ketoacidosis:

- 1) Abdominal pain at onset [0]
- 2) A serum bicarbonate of 10 mmol/l [100]
- 3) A serum glucose 14 mmol/l [0]
- 4) Decreased appetite in the past few days [0]
- 5) Shallow respirations [0]

a-An unusual but recognised feature particularly in children. However does not support a diagnosis of DKA. b-Suggests metabolic acidosis. c-'Normoglycaemic DKA' can occur and a glucose of 14 doesn't rule out the diagnosis but it does not support the diagnosis. d-Usually patients are unwell with infections and anorexia. e-Respiratory compensation leads to rapid deep (Kussmaul's) breathing. (Dr Mike Mulcahy)

22- A diagnosis of diabetes mellitus is being considered in 32-year-old woman who is 16 weeks pregnant. Her body mass index (BMI) was 22 kg/m² (18 - 25). A 75g oral glucose tolerance test revealed:

Time Plasma glucose concentration

0 hr 6.0 mmol/l (3.0-6.0)

2hr 12.5 mmol/l (<11.1)

Which of the following is the most appropriate step in the management of this patient?

- 1) Low calorie diet [0]
- 2) Glipizide therapy [0]
- 3) Metformin therapy [0]
- 4) Repeat her oral glucose tolerance test in four weeks [0]
- 5) Insulin therapy [100]

The result confirms a diagnosis of gestational diabetes mellitus with the 2hr OGTT result above 11.1 mmol/l. To minimise the fetal consequences of GDM (macrosomia, fetal malformations, still birth, IUGR etc), the patient's glycaemia should be strictly controlled with insulin. A low calorie diet is inappropriate and neither metformin nor glipizide are licenced for use in pregnancy. There is no point in repeating the OGTT in 4 weeks as control is required NOW.

23- A 28 year old female presents in the 24th week of pregnancy with profound tiredness and anxiety. Examination reveals a tremor, a pulse of 100 beats per minute and a soft bruit heard over the thyroid gland. Thyroid function tests show a free T4 of 32.9 pmol/l (NR 9.8 - 23.1) and a TSH of 0.04 mu/l (NR 0.5 - 4). Which of the following treatments would you select for this patient?

- 1) Radioactive iodine therapy [0]
- 2) Carbimazole [100]
- 3) Lithium [0]
- 4) Propranolol [0]
- 5) Potassium perchlorate [0]

This patient has Graves' disease and the most appropriate treatment for the thyrotoxicosis is carbimazole. This she should receive in the lowest dose to maintain euthyroidism. A block and replacement regime is not appropriate in pregnancy. Radioactive iodine is contra-indicated as it would also be taken up by the foetal thyroid. Propranolol would ameliorate the symptoms but may impact upon the fetus. Lithium is contr-indicated in pregnancy as is potassium perchlorate.

24- A 56 year old male presents with a 5 year history of increased sweats and change in shoe size. Examination reveals prognathism and macroglossia, with large hands. Blood pressure is 180/94 mmHg but visual field examination is full to confrontation. Which of the following tests would be diagnostic?

- 1) Oral glucose tolerance test [100]
- 2) TRH test [0]
- 3) Insulin tolerance test [0]
- 4) Pituitary MRI [0]

5) IGF-1 concentration [0]

The diagnosis of acromegaly is confirmed with a failure of GH suppression during an oral glucose tolerance test. Though a pituitary adenoma may be present it is not diagnostic of acromegaly.

25- Adult growth hormone deficiency is confirmed by:

- 1) A low IGF-1 concentration [0]
- 2) An undetectable random Growth hormone concentration. [0]
- 3) Suppression of GH below 2 mU/l (1.3 microg/l) with an oral glucose tolerance test [0]
- 4) A peak growth hormone concentration of 6 mU/l (2 microg/l) with insulin induced hypoglycaemia [100]
- 5) A low IGF binding protein-3 (IGFBP3) concentration [0]

The diagnosis of adult GHD depends on a peak GH response of less than 9 mU/l to insulin induced hypoglycaemia.

26- Testosterone

- 1) Is a steroid hormone [100]
- 2) Acts via cell surface receptors [0]
- 3) Acts via g-protein second messengers [0]
- 4) Is manufactured through the breakdown of oestradiol [0]
- 5) In the circulation is mostly bound to albumin [0]

Testosterone is a steroid hormone receptor and can be converted to oestradiol. It binds to intra-cellular receptors and is mostly bound to sex-hormone binding globulin.

27- A 36-year-old man attends clinic with his wife after failing to conceive after 10 years of marriage. Examination reveals that he is tall, thin and has bilateral gynaecomastia. Investigations show high levels of urinary gonadotrophins.

What is the most likely diagnosis?

- 1) Andropause [0]
- 2) Gaucher's disease [0]
- 3) Klinefelter's syndrome [100]
- 4) Marfan syndrome [0]
- 5) Noonan's syndrome [0]

Gaucher's and Marfan syndrome do not present with infertility. Noonan's is associated with short stature. Klinefelter's is a sex chromosome disorder affecting 1:400 - 1:600 male births typically with 47 XXY, XXXYY or XXYY. Andropause is the term for the gradual decrease in serum testosterone concentration with age, but does not occur, usually, until after the age of 50.

Average score for this question is 85% (answered 3161 times)

28- A previously fit 47 year old male presents with lower back pain from a vertebral collapse due to osteoporosis.

Which of the following investigations would be the most appropriate for this man?

- 1) oestrogen concentration [0]
- 2) prostate-specific antigen concentration [0]
- 3) prolactin concentration [0]
- 4) testosterone concentration [100]
- 5) thyroid function tests [0]

Osteoporosis in a young male would be unusual. Any symptoms or features of hypogonadism or hypercalcaemia should be elicited. Hyperprolactinaemia causes hypogonadism so a testosterone concentration would be far more relevant. Hyperthyroidism would need to be present for a considerable length of time before producing osteoporosis. Hypogonadism often goes unnoticed. Prostate malignancy does not cause osteoporosis.

29- Nitric Oxide

- 1) Is synthesised by the vascular smooth muscle [0]
- 2) Acts via cAMP as the second messenger [0]
- 3) Is manufactured from Glycine [0]
- 4) Is inactivated by superoxide dismutase [0]
- 5) Inhibits platelet aggregation [100]

Nitric Oxide is a free radical that is produced from l-arginine by nitric oxide synthase in the vascular endothelium. It is anti-atherogenic, causing vasorelaxation, inhibiting platelet aggregation and foam cell formation

30- Which of the following is a feature of Cushing's syndrome

- 1) Fibrous dysplasia [0]
- 2) Vertebral collapse [100]
- 3) Calcium pyrophosphate arthropathy [0]
- 4) Osteomalacia [0]
- 5) Osteoarthritis [0]

Vertebral collapse may be due to osteoporosis. Osteoarthritis and gout would be unusual with elevated corticosteroid concentrations. Osteomalacia is not a feature.

31- A 37 year old female presents with galactorrhoea. She has a history of dyspepsia for which she receives omeprazole. Examination reveals a BMI of 23.5 kg/m² and a small amount of galactorrhoea to expression. Investigations show a prolactin concentration of 850 mU/l (NR 50 - 500 mU/l), an oestradiol of 88 pmol/l (NR 130 - 500), a LH of 3.2 mU/l (NR 3.5 - 8) and a FSH of 2.8 mU/l (NR 3 - 8). What disorder should be considered?

- 1) Addison's disease [0]
- 2) Hyperthyroidism [0]
- 3) MEN type 1 [100]
- 4) Drug-induced hyperprolactinaemia [0]
- 5) Hypothyroidism [0]

The presence of hyperprolactinaemia with hypogonadotrophic hypogonadism suggests a diagnosis of a microprolactinoma and in combination with the recurrent dyspepsia a diagnosis of MEN type 1 should be considered. The galactorrhoea is not due to cimetidine as this does not cause hyperprolactinaemia. Addison's disease does not cause hyperprolactinaemia and both hypothyroidism and hyperthyroidism would not fit this clinical scenario.

32- Useful therapy for improving fertility in Polycystic ovarian syndrome include

- 1) Cyproterone acetate [0]
- 2) Ethinyl oestradiol [0]
- 3) Metformin [100]
- 4) Glibenclamide [0]
- 5) Spironolactone [0]

Metformin has been shown to increase the rate of conception in PCOs through improved insulin sensitivity. Ethinylloestradiol and cyproterone acetate combine to form Dianette the oral contraceptive. Spironolactone is used for hirsutism but is teratogenic. Glibenclamide is not used in PCOs.

33- A 60 year female presents with vague aches and pains and has a family history of osteoporosis. She is 10 years post-menopausal but has not taken any female HRT. Dual energy X-ray absorptiometry (DEXA) is requested. Which of the following values of bone mineral density measured by DEXA would signify osteopaenia at a measured site?

- 1) A T score of -2.6 [0]
- 2) A T score of -1.8 [100]
- 3) A Z score of -2.0 [0]
- 4) A z score of -1.5 [0]
- 5) A T score of -0.9 [0]

Osteopaenia is defined as a T score of between -1 and -2.5 standard deviations below the bone mineral density of a young female. Osteoporosis is defined as -2.5 SD. These measurements are important as they signify a greatly increased risk of fracture. Z scores refer to the bone mineral density compared with that of a 'normal' age matched subject.

34- A chromophobe adenoma of the pituitary would be expected in which of the following

- 1) Cushing's disease [0]
- 2) Acromegaly [0]
- 3) Non-functioning pituitary tumour [100]

- 4) TSH secreting tumour [0]
- 5) Prolactinoma [0]

A chromophobe adenoma refers to no uptake of dye within the tumourous specimen. This occurs in the non-secretory/non-functioning pituitary tumours.

35- Following factors decrease large intestinal motility:

- 1) Parasympathetic activity [0]
- 2) Anticholinergic agents [100]
- 3) Gastric Distension [0]
- 4) CCK-PZ [0]
- 5) Laxatives. [0]

The others and cholinergic agents increase large intestinal motility.

36- The peroxisome proliferator activated receptor gamma (PPAR gamma)

- 1) Is a steroid hormone receptor [0]
- 2) Is activated by free fatty acid as the endogenous ligand [100]
- 3) Is antagonised by thiazolinediones [0]
- 4) Is a member of the Cytokine receptor superfamily [0]
- 5) Is antagonised by Low density Lipoprotein (LDL). [0]

PPAR gamma is an intra-cellular receptor that is activated by free fatty acids (which are the natural endogenous ligands) and the Thiazolinediones such as Rosiglitazone and Pioglitazone. Activated it binds to the Retinoid X receptor and couples with DNA producing downstream gene activation with protein synthesis that controls adipocyte differentiation and function.

37- Which of the following statements are true of primary hyperparathyroidism?

- 1) It is associated with hypocalciuria due to elevated PTH levels. [0]
- 2) PTH is secreted in a pulsatile manner from the posterior pituitary and acts through PTH receptors on parathyroid cell membranes [0]
- 3) It is usually caused by an adenoma of a single parathyroid gland. [100]
- 4) It progresses to tertiary hyperparathyroidism with time. [0]
- 5) It is associated with bone resorption by PTH to restore depressed serum calcium levels to normal. [0]

"Primary HPT can be divided pathologically into adenoma, hyperplasia, and carcinoma. Adenomas clearly are the most prevalent entity representing 80-85% of cases. Hyperplasia is the second most common diagnosis constituting 15% of cases. Carcinoma represents <1% of total cases. Double adenoma has been found in approximately 5% of the time, and complicates the clinical distinction between adenoma and hyperplasia. Histologically, normal parathyroid tissue shows a cell to fat ratio of 1:1. Hypercellular parathyroid tissue is typified by the loss of the normal amount of fat. more ..."

<http://www.bcm.tmc.edu/oto/grand/12094.html>

In primary hyperparathyroidism there is usually hypercalciuria. Secondary hyperparathyroidism may progress to tertiary but primary does not.

38- A 70 year old male was receiving amiodarone 200 mg daily for intermittent atrial fibrillation. However, he was aware of tiredness and lethargy. He appeared clinically euthyroid with no palpable goitre. Investigations revealed:

Serum free T4 23pmol/L (9-26)
Serum total T3 0.8 nmol/L (0.9-2.8)
Serum TSH 8.2 mU/L (<5)

Which of the following statements would explain these results?

- 1) Abnormal thyroxine binding globulin [0]
- 2) Amiodarone-induced hypothyroidism [100]
- 3) 'sick euthyroid' syndrome [0]
- 4) Spontaneous hypothyroidism [0]
- 5) TSH secreting pituitary adenoma [0]

The results show normal T4, low T3 with elevated TSH. These results are typical of amiodarone induced hypothyroidism which inhibits the peripheral conversion of T4 to T3.

39- Which of the following is true concerning a 68 year old male with type 2 diabetes diagnosed with type IV renal tubular acidosis?

- 1) Aminoaciduria would be expected. [0]
- 2) Fludrocortisone treatment is effective [100]
- 3) Increased Glomerular filtration rate is expected. [0]
- 4) Increased urinary bicarbonate would be expected. [0]
- 5) Normal renal handling of K⁺ and H⁺ [0]

H⁺ secretion, sodium reabsorption and ammonia production diminishes. RTA 4 is in effect hyporeninaemic hypoaldosteronism or failure of aldosterone action and thus helped treated with mineralocorticoids. It is usually seen in chronic renal disease and hence low GFR and particularly. Aminoaciduria and increased urine bicarbonate are features of RTA types 1 and 2.

40- Which of the following is typically found in Pendred's syndrome

- 1) Mental retardation [0]
- 2) Sensorineural deafness [100]
- 3) Thyroid agenesis [0]
- 4) Thyrotoxicosis [0]
- 5) Cataract [0]

Pendred's is nerve deafness with goitre due to a defect of iodine binding. Patients are usually euthyroid.

41- A 52 year old female presents with tiredness. There are no specific abnormalities noted on examination, but investigations reveal a T4 of 21.1 (NR 9.8 - 23), a T3 of 5.2 pmol/l (NR 3.3 - 5.5) and a TSH of 0.05 mU/l (NR 0.1 - 5 mU/l). Thyroid autoantibody titres are all undetectable. These results suggest a diagnosis of

- 1) DeQuervain's thyroiditis [0]
- 2) Sick euthyroid syndrome [0]
- 3) Solitary toxic nodule [100]
- 4) Graves' disease [0]
- 5) Hashimoto's thyroiditis [0]

This patient has subclinical hyperthyroidism and, in the absence of thyroid auto-antibodies, the most probable explanation of these thyroid function abnormalities is a solitary toxic nodule.

42- Leptin

- 1) Is synthesised in the hypothalamus [0]
- 2) Reduces Basal metabolic rate [0]
- 3) Acts upon the adipocyte [0]
- 4) Produces satiety [100]
- 5) Plasma concentrations correlate directly with lean body mass. [0]

Leptin is synthesised within the adipocyte and plasma concentrations are directly related to adipocyte (fat) mass. It acts on centres within the hypothalamus to produce satiety

43- Which of the following concerning Diabetic retinopathy is correct?

- 1) Is unusual in type 2 diabetic patients [0]
- 2) Improved glycaemic control is more effective than hypertensive control in reducing progression of disease. [0]
- 3) Normal visual acuity is seen in Proliferative retinopathy. [100]
- 4) Progression may be reduced with statin therapy [0]
- 5) Soft exudates are a feature of background retinopathy. [0]

Diabetic retinopathy occurs in both type 1 and 2 DM and may be a presenting feature in Type2 as the condition may have existed for many years prior to diagnosis. Progression may be slowed with improved glycaemic and hypertensive control but the latter has been shown to be more effective at reducing progression (UKPDS). There are no data at present to suggest that Statin therapy reduces disease progression. Soft exudates are a feature of pre-proliferative Rn and despite quite marked new vessel disease the visual acuity may be normal.

44- In randomised clinical studies, post-menopausal hormone replacement therapy

- 1) Reduces cardiovascular mortality. [0]
- 2) Causes regression of coronary plaques. [0]
- 3) Increases plasma LDL concentrations. [0]
- 4) Increases plasma triglycerides [100]
- 5) Reduces the incidence of stroke [0]

In RCTs, HRT has not been shown to reduce CV mortality or the incidence of stroke (Heart Estrogen Replacement Study - HERS), nor does it cause regression of coronary plaques (Estrogen replacement and angiography study - ERA). It does not produce a raised LDL, but may increase HDL concentrations. Similarly it frequently produces a rise in triglyceride concentrations.

45- The following are features of pseudohypoparathyroidism:

- 1) Increased urinary phosphate and cAMP with PTH infusion [0]
- 2) Low serum PTH [0]
- 3) Low serum calcium and low serum phosphate [0]
- 4) Low serum calcium and high serum phosphate [100]
- 5) Shortened 2nd and 3rd metacarpals [0]

The biochemistry shows a hypocalcaemia with hyperphosphataemia being usual but elevated PTH due to resistance to parathormone (PTH). This is due to mutation of the PTH receptor with abnormality of the G α subunit with reduced cAMP production following a PTH infusion. There are associated phenotypic signs including short stature, low IQ and shortened 4th and 5th metacarpals.

46- A 55 year old male presents with anorexia and weight loss of 12 months duration. Over this year he has had two deep vein thromboses and had the last whilst his INR was 2. He remains on long-term warfarin therapy with an INR above 2.6. Examination reveals that he is pigmented and has a postural drop in his blood pressure of 15 mmHg.

Investigations are as follows:

sodium concentration 131 mmol/l
potassium 5.0 mmol/l
INR 3.0

A Short synacthen test reveals a baseline cortisol concentration at time 0 of 120 nmol/l which rises to 155 nmol/l after 30 minutes (Normal response >550 nmol/l). Which single diagnosis would explain this patient's illness?

- 1) Addison's disease [0]
- 2) Anti-phospholipid syndrome [100]
- 3) Autoimmune Polyendocrine Syndrome (Schmidt's disease) [0]
- 4) Protein S deficiency [0]
- 5) Pituitary infarction [0]

With a history of recurrent DVT and confirmed hypoadrenalism this patient is likely to have the antiphospholipid syndrome. Antiphospholipid syndrome is a primary diagnosis or may co-exist with SLE. Anti-Cardiolipin antibodies or Lupus anticoagulant may be present. It is associated with arterial and venous thrombosis and has a predilection for the adrenal veins causing adrenal infarction with consequent hypoadrenalism. Addison's disease is an autoimmune phenomenon and is not associated with DVT. The pigmentation (due to increased ACTH in hypoadrenalism)

would exclude pituitary infarction as the cause of the hypoadrenalism.
Hypoadrenalism is not associated with protein S deficiency. Autoimmune
Polyendocrine syndrome is associated with hypothyroidism, type 1 diabetes, Addison's
disease.

47- Growth hormone therapy is a recognised cause of

- 1) Benign prostatic hypertrophy [0]
- 2) Melanoma [0]
- 3) Benign intra-cranial hypertension [100]
- 4) Prolongation of the QT interval [0]
- 5) Osteoporosis [0]

GH is rarely associated with BIH, the mechanism probably is related to fluid
retention. The commonest side effect of GH therapy is fluid retention, though other
side effects include gynaecomastia, hypertension and atrial fibrillation. BPH has not
been reported.

48- In which of the following conditions would it be expected to find an elevated
plasma total cortisol concentration?

- 1) congenital adrenal hyperplasia [0]
- 2) patients on long-term benzodiazepine therapy [0]
- 3) patients taking prednisolone [0]
- 4) pregnancy [100]
- 5) primary aldosteronism [0]

Cortisol levels are increased in pregnancy, conditions of physical and emotional stress
and drug therapy (oestrogens, oral contraceptives, amphetamines, cortisone, and
spironolactone). Treatment with other forms of steroid lead to decreased levels of
cortisol.

49- Which of the following compounds has a vasodilating effect?

- 1) Antidiuretic hormone [0]
- 2) Calcitonin [100]
- 3) Endothelin [0]
- 4) Renin [0]
- 5) Somatostatin [0]

ADH acts on the Vasopressor receptors to cause vasoconstriction. Endothelin is also a
vasoconstrictor as is renin. Somatostatin is also recognised to produce
vasoconstriction of the splanchnic system.

50- In active acromegaly with associated diabetes mellitus which of the following
findings would be expected?

- 1) Diabetes mellitus is due to an auto-immune process [0]
- 2) Growth hormone concentrations are suppressed with hyperglycaemia [0]
- 3) IGF-1 concentrations are low [0]
- 4) There is insulin resistance [100]

5) Treatment with a somatostatin analogue is contra-indicated [0]

Insulin resistance stems from the excessive growth hormone concentrations (anti-insulin effects) that of course fail to suppress with hyperglycaemia. Acromegaly is often effectively treated with somatostatin analogues which may improve glycaemic control. Many of the effects of GH are mediated through IGF-1 whose concentrations are high in acromegaly. Diabetes mellitus is due to the insulin resistance and is not due to auto-immune insulinitis.

51- A 51-year-old healthy man is found to have bilateral breast enlargement. He says that this is normal for him and that he has not noted any change in years. Which of the following is most likely to be present?

- 1) 47, XXY karyotype [100]
- 2) History of antidepressant drug therapy [0]
- 3) Increased risk for breast carcinoma [0]
- 4) Increased testosterone levels [0]
- 5) Seminoma of the testis [0]

Gynaecomastia is common with Klinefelter's syndrome. Male breast cancer is rare and is more often associated with advanced age. There is an association between gynaecomastia and some functioning testicular tumors such as Leydig cell tumors (or rarely, Sertoli cell tumors). Gynaecomastia is related to conditions of high oestrogens, and one of the most common causes for this is cirrhosis of the liver in chronic alcoholics.

52- Which of the following suggests a diagnosis of familial combined hyperlipidaemia (FCHL) rather than heterozygous familial hypercholesterolaemia (FH)?

- 1) Tendon xanthomas [0]
- 2) Presence of glucose intolerance [100]
- 3) Strong family history of premature coronary artery disease [0]
- 4) Presence of arcus senilis [0]
- 5) Absence of hyperuricaemia [0]

The genetic dyslipidaemias occur in one third of patients who have suffered from their first myocardial infarction below the age of 50 years in men. The commonest is familial combined hyperlipidaemia (two thirds), with a fifth due to familial hypercholesterolaemia. The former can be diagnosed only on family studies, and there is elevation of fasting plasma triglycerides not associated with hyperchylomicronaemia. It is autosomal dominant, and some family members may have hyperchylomicronaemia. Only 20% of children have elevated triglycerides before the age of 25. Obesity, insulin resistance, hyperinsulinaemia, glucose intolerance, and hyperuricaemia are associated. Heterozygous familial hypercholesterolaemia is dominantly inherited, and results from defects in the LDL receptor. The most important clinical manifestation is premature coronary artery disease, particularly with onset between the third or fourth decade. Tendon xanthomata and arcus cornea are rarely present in children, but are very important signs to identify.

53- Which of the following is associated with a GH secreting pituitary tumour

- 1) Gs alpha subunit mutation [100]
- 2) Pit-1 mutation [0]
- 3) H-ras mutation [0]
- 4) Rb 1 mutation [0]
- 5) p53 mutation [0]

A stimulatory mutation of the Gs protein alpha subunit has been noted in approximately 30% of GH secreting pituitary tumours.

54- An 16-year-old man presents with polyuria and polydipsia. Which of the following may confirm the diagnosis of diabetes mellitus?

- 1) A random plasma glucose of >7.5 mmol/L [0]
- 2) A finding of 3+ ketonuria [0]
- 3) An HbA1c of 7.0% [0]
- 4) A fasting plasma glucose of 7.5 mmol/L [100]
- 5) An abnormal glucose tolerance test [0]

The diagnosis is usually relatively easy to confirm in a symptomatic subject. A random glucose of >11.1 mmol/L or a fasting glucose of >7.0 mmol/L would be regarded as confirmatory. There is usually glycosuria in addition to ketonuria. Isolated ketonuria suggests fasting. A raised glycosolated haemoglobin (HbA1c) is also highly suggestive but not diagnostic. A glucose tolerance test is rarely needed.

55- Carcinoid tumours of the foregut may be associated with which of the following

- 1) Cushing's syndrome [100]
- 2) Hypercalcaemia [0]
- 3) Pellagra [0]
- 4) Pulmonary hypertension [0]
- 5) Carcinoid syndrome [0]

Carcinoid tumours of the foregut unlike tumours of the midgut are not associated with carcinoid syndrome but may secrete CRF/ACTH resulting in ectopic Cushing's syndrome. Other associated conditions include somatostatinoma, Zollinger-Ellison syndrome and Acromegaly (ectopic GHRH).

56- A 35 year-old woman presented with a five year history of weight gain associated with a one year history of amenorrhoea. Over this time she had also noticed hirsutism and had been trying to conceive. On examination, she had a BMI of 32 kg/m², a pulse was 84 beats per minute, and a blood pressure of 154/100 mmHg. Features suggestive of Cushing's syndrome were also noted.

Which of the following would be the most useful initial investigation?

- 1) 24 hour urinary free cortisol concentration [100]
- 2) Combined 9am ACTH concentration and serum cortisol concentration [0]
- 3) Midnight cortisol concentration [0]
- 4) Serum sodium and potassium concentrations [0]
- 5) The 1mg overnight dexamethasone suppression test [0]

A ridiculous question! Totally unfair expecting candidates to know which screening test is better – 1 mg ODS or UFC. Either test would be appropriate, but UFC is often recommended and has a 95% specificity (85% specificity in the obese) and a 98% sensitivity. The ODS has a sensitivity and specificity of 98% and 75-80% in obese subjects with a cut-off value of 50 nmol/l. Therefore, purely for convenience sake a UFC would probably be the expected response here. Midnight cortisol is pointless as a screening test expecting the patient to be fast asleep when blood is taken. Sodium and Potassium concentrations offer nothing, nor do ACTH and cortisol.

57- A 16 year old girl with obesity was referred with abdominal swelling and mild ankle oedema. On examination the blood pressure was 140/90 mmHg. Investigations revealed: Haemoglobin 10.5g/dL (11.5-16.5), Serum biochemistry normal, Serum albumin 34 g/L (37-49), Urine dipstick proteinuria + Which investigation should be performed next?

- 1) 24 hour urinary protein estimation. [0]
- 2) Abdominal ultrasound. [0]
- 3) Plasma protein electrophoresis. [0]
- 4) Urinary albumin: creatinine ratio. [0]
- 5) Urinary B-human chorionic gonadotrophin test (B-HCG) [100]

This young girl has been 'gaining weight', has abdominal swelling and ankle oedema. She is hypertensive and has a mild anaemia with proteinuria. These signs should 'ring a bell' suggesting a concealed pregnancy with pre-eclampsia. The most relevant investigation would be a pregnancy test – urinary B-HCG.

58- Growth hormone deficiency is noted in:

- 1) Turner's syndrome [0]
- 2) Constitutional short stature [0]
- 3) Laron's syndrome [0]
- 4) Sheehan's syndrome [100]
- 5) Chronic renal failure [0]

Sheehan's syndrome is post-delivery infarction of the pituitary and GHD is typical. Although GH therapy is used in CRF, Turner's syndrome and short stature, subjects are not GH deficient. Laron's syndrome is due to a GH receptor defect with impaired IGF-1 production.

59- A 33 year old female presents with tiredness and lethargy. Five years previously she had undergone a frontal surgery for a craniopharyngioma following presentation with amenorrhoea and headache. Post-operatively she developed seizures and was treated with sodium valproate. She was demonstrated to be hypopituitary and receives hydrocortisone, thyroxine, oestrogen replacement therapy and desmopressin. Which of the following investigations would you select to confirm a growth hormone deficiency.

- 1) IGF-1 concentration [0]
- 2) Insulin tolerance test [0]

- 3) Clonidine test [0]
- 4) L-dopa test [0]
- 5) GHRH/Arginine test [100]

This patient is more than likely to be GH deficient which would explain the lethargy but this requires confirmation before initiating treatment. Although an insulin tolerance test is the gold standard for the diagnosis of GHD, it is contra-indicated due to the epilepsy. Therefore GHRH/arginine is regarded as a suitable alternative.

60- A 19 year old female is concerned following exposure to meningococcal meningitis. Her flatmate contracted meningococcal meningitis and she now wants preventative treatment. She is generally well without any past medical history. She takes Logynon as a contraceptive agent and uses a salbutamol inhaler infrequently. Which prophylactic anti-microbial treatment would you select?

- 1) Clarithromycin [0]
- 2) Ciprofloxacin [100]
- 3) Augmentin [0]
- 4) Doxycycline [0]
- 5) Rifampicin [0]

Rifampicin is a reasonable choice as prophylaxis against meningococcal infection but in this 19 year old sexually active student may be expected to reduce the efficacy of the oral contraceptive through liver enzyme induction. Therefore Ciproxin would be the most appropriate agent from the above list as it does not induce Cytochrome p450.

61- A 64 year old female is diagnosed with osteoporosis and is receiving treatment with Raloxifene. What is raloxifene?

- 1) A synthetic oestrogen [0]
- 2) A bisphosphonate [0]
- 3) An androgenic steroid [0]
- 4) A selective androgen receptor modulator (SARM) [0]
- 5) A selective oestrogen receptor modulator (SERM) [100]

Raloxifene, like tamoxifen is a SERM, with oestrogen like activity at sites like bone but anti-oestrogen like effects on breast/endometrium.

62- A previously fit 30 year old male presents with a two months history of weight loss, tiredness and nausea. Investigations show:

Haemoglobin 10.5 g/dL (13.0 – 18.0)
 MCV 88 fL (80 – 96)
 white cell count 6.0 X 10⁹/L (4 – 11)
 platelet count 450 X 10⁹/L (150 – 400)
 serum sodium 130 mmol/L (137 – 144)
 serum potassium 5.7 mmol/L (3.5 – 4.9)
 serum urea 3.0 mmol/L (2.5 – 7.5)
 serum creatinine 78 umol/L (60 – 110)

serum Total T4 55 nmol/L (50 – 150)
serum TSH 8 mU/L (0.2 – 5.5)

Which of the following is the most useful diagnostic investigation?

- 1) anti-thyroid peroxidase antibody titre [0]
- 2) insulin tolerance test [0]
- 3) free thyroxine concentration [0]
- 4) short synacthen test [100]
- 5) TRH test [0]

This patient presents with weight loss, tiredness and nausea. He has hyponatraemia, hyperkalaemia and what appears to be a mild primary hypothyroidism. The diagnosis is likely to be Addison's (primary hypoadrenalism) disease and the most appropriate test would be a short synacthen test. An insulin tolerance test is contra-indicated in patient's in whom cortisol is less than 100 nmol/l. A TRH test is rarely performed these days and really is an irrelevance.

63- Which ONE of the following is true concerning Antidiuretic hormone (ADH)?

- 1) Carbamazepine potentiates it's release [100]
- 2) Ethanol potentiates it's release [0]
- 3) It circulates in the blood bound to neurohypophysin [0]
- 4) It is a cyclic octapeptide [0]
- 5) It is synthesised in the posterior pituitary [0]

ADH is a nonapeptide manufactured in the paraventricular and supra-optic nuclei of the hypothalamus and released from the posterior pituitary. It acts on the collecting ducts improving water permeability and hence water retention. Carbamazepine as well as other agents such as thiazides and SSRIs may potentiate its release. Ethanol usually inhibits release.

64- A 55 year old man presents with gynaecomastia while receiving treatment for Heart failure.

Which of the following drugs is most likely to be the cause of his gynaecomastia?

- 1) Amiloride [0]
- 2) Carvedilol [0]
- 3) Frusemide [0]
- 4) Omeprazole [100]
- 5) Ramipril [0]

Omeprazole is associated with gynaecomastia.

65- A 20 year old female patient is referred with primary amenorrhoea. Investigations reveal a 46 XY karyotype. Which of the following concerning the condition is true?

- 1) It is likely that her mother received stilboestrel in pregnancy [0]
- 2) It is likely that her mother received Carbimazole for thyrotoxicosis during pregnancy [0]

- 3) Low testosterone and oestradiol concentrations would be expected [0]
- 4) The diagnosis is likely to be testicular feminisation syndrome [100]
- 5) The diagnosis is Noonan's syndrome [0]

A female phenotype can occur in testicular feminisation, a condition associated with androgen insensitivity due to an androgen receptor defect. Stilboestrel therapy has been associated with the induction of latent tumours and to influence sexual behaviour but is not associated with abnormalities of sexual identity. In Noonan's syndrome, infants are males but physical features resemble that found in Turner's syndrome. Neither prednisolone nor maternal thyrotoxicosis would cause gender mal-assignment problems.

66- Which of the following techniques would be most useful in the differential diagnosis between ectopic Cushing's syndrome and pituitary dependent Cushing's disease.

- 1) Urine free cortisol [0]
- 2) High dose Dexamethasone suppression test [0]
- 3) ACTH concentrations [0]
- 4) Inferior petrosal sinus sampling [100]
- 5) CRF test [0]

Inferior petrosal sinus sampling with an elevated central ACTH concentration compared with the peripheral value is the most valuable test in the differential diagnosis of either Cushing's disease or ectopic Cushing's syndrome. The other tests are far less useful in comparison.

67- A 60-year-old female was prescribed thyroxine 150 µg daily for hypothyroidism. She was clinically hypothyroid and no goitre was present. Investigations revealed:

serum total T4 concentration 68 nmol/L (55 – 145)
 serum total T3 concentration 0.5 nmol/L (0.9 – 2.5)
 serum TSH concentration 70 mU/L (0.5 – 4)

Which of the following would be the next step in her management?

- 1) Investigation for TSH secreting pituitary tumour [0]
- 2) Measurement of free thyroxine concentration [0]
- 3) Questioning of the patient about compliance [100]
- 4) She has sick euthyroid syndrome, no further investigation required [0]
- 5) Thyroid ultrasound scan [0]

No one measures total Thyroid hormone levels any more except the RCP. Pathetic! This patient has a raised TSH but normal total thyroxine and a low T3. Either there is a block on the conversion of T4 to T3 or as seems more likely the patient has just taken the T4 prior to coming to clinic. The explanation is non-compliance.

68- Which of the following antibodies are typically found in auto-immune adrenalitis (Addison's disease)

- 1) Anti-rho antibody [0]
- 2) Anti-peroxidase antibody [0]
- 3) Anti-21hydroxylase antibody [100]
- 4) Anti-nuclear antibody [0]
- 5) Anti-tryptophan hydroxylase antibody [0]

21 hydroxylase is the enzyme involved in the cholesterol steroid pathway and has been found to be present in approximately 80% of cases.

69- A diagnosis of diabetes mellitus is being considered in 32-year-old woman who is 16 weeks pregnant. Her body mass index (BMI) was 22 kg/m² (18 - 25). A 75g oral glucose tolerance test was reported as follows

time Plasma glucose concentration Normal range
 0 hr 6.0 mmol/l 3.0-6.0
 2hr 12.5 mmol/l <11.1

Which of the following is the most appropriate next step in the management of this patient?

- 1) Glipizide therapy [0]
- 2) Insulin therapy [100]
- 3) Low calorie diet [0]
- 4) Metformin therapy [0]
- 5) Repeat OGTT in four weeks [0]

The result confirms a diagnosis of gestational diabetes mellitus with the 2hr OGTT result above 11.1 mmol/l. To minimise the fetal consequences of GDM (macrosomia, fetal malformations, still birth, IUGR etc), the patient's glycaemia should be strictly controlled with insulin. A low calorie diet is inappropriate and neither metformin nor glipizide are licenced for use in pregnancy. There is no point in repeating the OGTT in 4 weeks as control is required NOW.

70- A previously well 60 year old lady is admitted with an Acute Anterior Myocardial Infarction. A random blood glucose concentration was found to be 12.1 mmol/L (<6.7).

What is the optimal management of her blood sugar?

- 1) Diet [0]
- 2) Gliclazide [0]
- 3) Intravenous insulin plus dextrose [100]
- 4) Metformin [0]
- 5) Subcutaneous insulin [0]

The DIGAMI study has demonstrated that there is a survival advantage in initially treating such patients with elevated glucose concentrations with sliding scale insulin for 24 hours post-infarct and then switching to three months subcutaneous insulin. (Almbrand B, Johannesson M, Sjostrand B, Malmberg K, Ryden L. Cost Effectiveness of Intense Insulin Treatment after Acute Myocardial Infarction in

Patients with Diabetes Mellitus. Results from the DIGAMI study Eur Heart J 2000; 21: 733-39)

71- A 53 year old male is suspected of having acromegaly.
Which of the following is the best investigation to confirm the diagnosis?

- 1) 9am growth hormone concentrations [0]
- 2) An insulin tolerance test with growth hormone concentrations [0]
- 3) Glucose tolerance test with growth hormone concentrations [100]
- 4) Growth hormone releasing hormone test [0]
- 5) insulin-like growth factor-1 (IGF-1) [0]

The diagnosis of Acromegaly is confirmed by inadequate suppression of GH concentrations below 2 mU/l in an oral glucose tolerance test. Although IGF-1 concentrations are elevated these are not diagnostic and may fall during illness.

72- In the treatment of osteoporosis, which of the following best describe the drug Raloxifene?

- 1) A Bisphosphonate [0]
- 2) A Calcium Receptor Modulator [0]
- 3) An Estrogen [0]
- 4) A PTH receptor agonist [0]
- 5) A Selective Estrogen Receptor Modulator [100]

Raloxifene is the first of the so-called Selective Estrogen Receptor Modulators. There are fundamentally two types of estrogen receptor, alpha and beta, distributed at locations such as breast, uterus, bone and in the vasculature. Raloxifene acts as an estrogen agonist at some sites eg Bone to increase mineralisation but acts as an antagonist at other sites eg uterus/breast (preventing endometrial/breast hyperplasia).

73- Which of the following has a known association with phenylketonuria?

- 1) Presentation in the second year of life with absence seizures. [0]
- 2) The association of red hair and brown eyes. [0]
- 3) Normal development. [0]
- 4) Musty odour. [100]
- 5) Response of some patients to piridoxine. [0]

Phenylketonuria is a quarter as common as congenital hypothyroidism, with an incidence of 1:10,000 live births. It is due either to phenylalanine hydroxylase deficiency or problems with synthesis or recycling of the bioprine co-factor. The presentation is with infantile spasms or developmental delay between 6 and 12 months of age. Patients may be musty smelling, fair haired and blue eyed and may develop eczema. Treatment is with restriction of dietary phenylalanine, while ensuring sufficient for physical and neurological growth. Co-factor defects are treated with a diet low in phenylalanine and high in neurotransmitter precursors.

74- Which of the following is a characteristic feature of primary hyperaldosteronism?

- 1) Gross oedema [0]

- 2) Hyponatraemia [0]
- 3) Muscular weakness [100]
- 4) Oliguria [0]
- 5) Vitiligo [0]

Primary hyperaldosteronism or Conn's syndrome is characterised by hypokalaemic hypertension. Patients can present with tetany (alkalosis) and muscle weakness (hypokalaemia). Oedema, oliguria are more features of secondary hyperaldosteronism (cirrhosis) and vitiligo (suggesting auto-immunity) is not a feature.

75- Which of the following is NOT associated with hyponatraemia and hyperkalaemia?

- 1) Acute hypoadrenalism [0]
- 2) Carbenoxolone therapy [100]
- 3) Co-Amilorfruse therapy [0]
- 4) Congestive cardiac failure. [0]
- 5) Type IV renal tubular acidosis [0]

Carbenoxolone therapy may be associated with hypokalaemia and salt retention due to pseudohypoaldosteronism through inhibition of the enzyme 11 beta Hydroxysteroid dehydrogenase. Type IV renal tubular acidosis is associated with hyporeninaemic hypoaldosteronism and both hyponatraemia and hyperkalaemia can occur. Hypoadrenalism is associated with hyperkalaemia and hyponatraemia as is Cardiac failure, hepatic and renal failure. Co-amilofruse the combination of amiloride and frusemide may also produce this biochemical picture.

76- A 30 year old man had a blood pressure of 150/100 mmHg. Clinical examination was normal. Which one of the following would suggest secondary hypertension?

- 1) 24 hour urinary protein excretion of 1.6g (<0.2) [100]
- 2) A Creatinine clearance of 90 mL/min (70-140) [0]
- 3) Left ventricular hypertrophy criteria on the ECG [0]
- 4) The presence of arteriovenous nipping on fundoscopy. [0]
- 5) Serum potassium of 3.9 mmol/L (3.5-4.9) [0]

It is rather young for a 30 year old to be hypertensive but the presence of such a nephrotic range of urine protein would suggest renal origin – Polyarteritis nodosa etc. The potassium concentration is normal and although it does not exclude Conn's it is certainly not suggestive. LVH would be found with sustained hypertension of any aetiology as would av nipping. The creatinine clearance is normal.

77- A 15-year-old girl complained of anxiety and excessive sweating. She was not taking any medication.

Investigations showed:

TSH concentration 0.9 mU/L (0.5-3.4)
free T4 concentration 16 pmol/L (10-18)

total T4 concentration 180 nmol/L (55-145)
free T3 concentration 8.2 pmol/L (3.5-10.5)
total T3 concentration 3.3 nmol/L (0.9-2.5).

These results are compatible with which one of the following diagnoses?

- 1) Factitious thyrotoxicosis [0]
- 2) Familial dysalbuminaemic hyperthyroxinaemia [0]
- 3) Pregnancy [100]
- 4) Sick euthyroid syndrome [0]
- 5) Thyrotoxicosis [0]

The symptom complex is intentionally misleading. The patient has a normal TSH and normal free T3 and T4 concentrations, excluding thyrotoxicosis but elevated Total concentrations suggesting a rise in the binding globulins. This can occur in pregnancy. Sick euthyroidism would be typically associated with low thyroid hormone concentrations.

Thyrotoxicosis:

CAUSES: PRIMARY:

- 1) GRAVE'S DISEASE: Common. Cause unknown but thyroid stimulating antibodies present in serum which bind to the TSH receptor. Familial predisposition exists. Associated with infiltrative ophthalmopathy (ref. BMJ.1990:300:1352) and dermopathy (pretibial myxoedema) which are specific for Grave's. There is a diffuse goitre and a bruit may be present. The TSH is low, RAIU increased. T3 levels are relatively higher than T4 levels in most cases. TREATMENT:(ref. NEJM.1991:324: 989)
- 2) TOXIC ADENOMA AND TOXIC MULTINODULAR GOITRE (PLUMMER'S DISEASE): One or more autonomous hyperfunctioning nodules. TSH is low, RAIU is increased in nodules but decreased in the rest of the gland. There is autonomous production of thyroxine independent from TSH. Multinodular goitre preeddisposes to iodine induced hyperthyroidism.
- 3) THYROIDITIS: Painful granulomatous Subacute thyroiditis (de Quervain's) 50% have a clinically hyperthyroid phase. Usually age 20-60yrs, follows a viral illness, HLA-B35. ESR usually >50, RAIU is decreased. . The initial treatment is aspirin, prednisone may be required if no response. TFT's usually return to normal.
- 4) FUNCTIONING FOLLICULAR CARCINOMA: rare.

SECONDARY:

- 1) EXCESS THYROID REPLACEMENT (thyrotoxicosis factitia+ Hamburger thyrotoxicosis). RAIU is decreased. Thyroglobulin levels are useful in discriminating the factitious disorder from the other causes of thyrotoxicosis with a decreased RAIU (thyroiditis, hyperthyroidism + Iodine excess, struma ovarii). In thyroiditis, thyroglobulin (the precursor of thyroid hormone) also leaks out of the thyroid so serum levels are high. If patients are taking thyroxine the levels of thyroglobulin will be low. Normal range = 2-30ng/ml. (ref. NEJM.1982;307:410-2, JAMA. 1983; 250:2352-7).

- 2) **EXCESS PRODUCTION OF TSH (RARE):** Pituitary tumour or failure of normal feed-back.
- 3) **ECTOPIC THYROID TISSUE:** Struma ovarii, embryonal carcinoma (hydatidiform mole + choriocarcinoma).

TREATMENT:

- 1) **CARBIMAZOLE + PROPYLTHIOURACIL:** Prevent the synthesis of thyroid hormones by inhibiting the enzymes necessary for iodine organification.
- 2) **PROPRANOLOL:** Reduces sympathetic manifestations and may reduce the conversion of T₄ to T₃.

Thyrotoxicosis in pregnancy:

90-95% of cases due to Grave's disease. **FETAL RISKS:** increased perinatal mortality, 20% are premature, 3% develop overt fetal thyrotoxicosis, 3% biochemical thyrotoxicosis, 3% hypothyroid, 6% minor congenital anomalies. **MATERNAL RISKS:** 10% develop cardiac failure. **POST PARTUM THYROIDITIS:** occurs in 5% of women. Present with painless goitre and symptoms of thyrotoxicosis 1-3 months post-partum (85% have anti-microsomal antibodies, normal ESR, decreased RAIU). Thyrotoxic phase is very brief (2-5 months) and treatment is seldom required. 1/3 become hypothyroid at 4-6 months and may present as postnatal depression. **PROGNOSIS:** Most are euthyroid at 1 year post-partum. 10-25% recurrence with subsequent pregnancies. Up to 40% will become hypothyroid in the long term (yearly TFT's recommended).

78- Which one of the following is a feature of the VIPoma syndrome?

- 1) Alkalosis [0]
- 2) Hypoglycaemia [0]
- 3) Hypokalaemia [100]
- 4) Increased gastric acid secretion [0]
- 5) Provocation of VIP release by somatostatin [0]

a, b, d, e: All opposite to what is expected. **VIPOMA** -Features vasoactive intestinal polypeptide secreting tumour, mainly pancreas rarely ganglioneuroblastoma (sympathetic chain or adrenal cortex), secretory diarrhoea ('pancreatic cholera'), weight loss, dehydration, abdominal colic, cutaneous flushing, raised plasma VIP, urea+Calcium, raised plasma pancreatic polypeptide, hypokalaemic acidosis (loss of alkaline secretions), achlorhydria, mildly raised glucose, normal functions of VIP. - increased intestinal secretion water and electrolytes -peripheral vasodilation -inhibits gastric acid secretion -potentiates acetylcholine action on salivary glands

79- A 53-year-old man presented with hypertension of 150/110 and is found to have the following results on investigation. Raised serum sodium, raised urinary potassium excretion and normal serum renin. What is the likely diagnosis?

- 1) Adrenocortical adenoma [100]
- 2) Coarctation of aorta [0]
- 3) Malignant hypertension [0]
- 4) Pheochromocytoma [0]
- 5) Renal tumour [0]

Aldosterone promotes active sodium transport and excretion of potassium in the renal tubules (and also sweat glands, salivary glands and colon). "Clinically, [Primary hyperaldosteronism] Conn's syndrome is characterized by hypertension (often diastolic hypertension), muscular weakness, paresthesias, headache, polyuria, and polydipsia." Read more ...

<http://www.amershamhealth.com/medcyclopaedia/Volume%20IV%202/ALDOSTERONOMA.asp>

80- A 32 year old female presents with a 2 month history of agitation, menstrual irregularity and weight loss. Examination reveals a tremor and a palpable goitre with a bruit. Which of the following would most likely be present in this patient:

- 1) Thyroid microsomal antibodies [0]
- 2) Thyroid peroxidase antibodies [0]
- 3) TSH receptor stimulating antibodies [100]
- 4) TSH receptor inhibiting antibodies [0]
- 5) Anti-thyroglobulin antibody [0]

This patient is most likely to have Graves' disease as revealed by the thyroid bruit. TSH receptor stimulating antibody is specific for Graves' disease and is present in the vast majority of cases.

81- A 55 year-old female complaining of vague tiredness is found to have a serum corrected calcium concentration of 2.9 mmol/l. Examination was unremarkable. Which of the following results confirms the suspected diagnosis of primary hyperparathyroidism?

- 1) High normal 1,25-dihydroxyvitamin D concentration [0]
- 2) High normal 24 hour urinary calcium concentration [0]
- 3) High normal plasma parathyroid hormone concentration [100]
- 4) Low normal plasma phosphate concentration [0]
- 5) Low normal serum 25-hydroxyvitamin D concentration [0]

Bit too easy really. A high or even normal PTH concentration in the presence of hypercalcaemia would support the diagnosis of hyperparathyroidism. A high urinary Calcium concentration may be expected as would a low plasma phosphate but neither confirm the diagnosis. Elevated 1,25 VitD suggests a diagnosis of hypervitaminosis D.

82- Osteomalacia may be expected in

- 1) Sarcoidosis [0]
- 2) Auto-immune adrenalitis [0]
- 3) Pseudo-hypoparathyroidism [0]
- 4) Pernicious anaemia [0]
- 5) Mercury poisoning [100]

Osteomalacia may occur with vitamin D deficiency. Mercury poisoning or any heavy metal poisoning causes an acquired Fanconi syndrome with distal renal tubular acidosis.

83- Which of the following is a cause of the syndrome of inappropriate ADH secretion:

- 1) Bendrofluazide [0]
- 2) Fluoxetine [100]
- 3) Dexamethasone [0]
- 4) Carbenoxolone [0]
- 5) Lithium [0]

SSRIs are a recognised cause of SIADH. Bendrofluazide would cause excess renal Na losses. Carbenoxolone would cause apparent mineralocorticoid excess with hypokalaemia and salt retention as would dexamethasone. Lithium causes diabetes insipidus.

84- A 64 year old male presents with difficulty in micturition. He is diagnosed with benign prostatic hyperplasia and elects to receive finasteride. Production of which of the following hormones would be selectively inhibited?

- 1) Testosterone [0]
- 2) Dihydroepiandrosterone sulphate (DHEAS) [0]
- 3) Androstenedione [0]
- 4) Dihydrotestosterone (DHT) [100]
- 5) IGF-1 [0]

Finasteride is a 5 alpha-reductase inhibitor and inhibits the conversion of testosterone to the active DHT.

85- A 30 year old female presents with mild galactorrhoea. Biochemistry reveals an elevated prolactin of 1200 mu/l (NR 50-450) and an oestradiol concentration of 100 pmol/l (NR 130-450). Which of the following is the likely cause?

- 1) Addison's disease [0]
- 2) Hyperthyroidism [0]
- 3) Non-functioning pituitary tumour [100]
- 4) Sheehan's syndrome [0]
- 5) Post-cranial irradiation for acute lymphocytic leukaemia as a child [0]

Addison's may be associated with hypogonadism but prolactin concentrations are usually normal. Severe hypothyroidism is associated with HyperPRL hypogonadism. A NFPT may cause hyperprolactinaemia through stalk compression. Sheehan's syndrome is associated with a low prolactin concentration. Cranial irradiation may initially cause hyperprolactinaemia but a low PRL is typical after a year.

86- A 51-year-old female is referred by her GP over concerns about osteoporosis. She had a hysterectomy and oophorectomy because of uterine fibroids one year ago, after which she developed hot flushes that now have stopped. Her elderly mother recently fractured the neck of her femur and the patient is worried about the possibility that she too will fracture her hip later in life.

She is otherwise well, is a non-smoker drinks about 5 units of alcohol weekly and has a healthy diet.

Examination reveals a fit thin female with a BMI of 18, her blood pressure is 122/88mmHg and breast examination is normal.

Which of the following would you recommend for her?

- 1) Bisphosphonates [0]
- 2) Calcitonin [0]
- 3) Combined Oestrogen and progesterone therapy [0]
- 4) Unopposed Oestrogen therapy [100]
- 5) Vitamin D [0]

This patient has a risk for osteoporosis being thin and recently having had Oophrectomy. Department of Health guidelines would support the use of Oestrogen replacement as first-line therapy in such patients. Unopposed oestrogen therapy is most appropriate as the patient has had a hysterectomy and combined HRT is unnecessary. Tibolone, Raloxifene and Bisphosphonates are recommended as second line agents where HRT may be poorly tolerated or contra-indicated.

<http://www.doh.gov.uk/osteop.htm>

87- Which of the following doses of prednisolone is equivalent in its glucocorticoid potency to 20mg of hydrocortisone.

- 1) 2 mg [0]
- 2) 5 mg [100]
- 3) 10 mg [0]
- 4) 15 mg [0]
- 5) 20 mg [0]

It is important to know the relative potencies of the glucocorticoids. Dexamethasone for instance is roughly 30 times more potent than hydrocortisone.

88- A 73 year old female is diagnosed with Cushing's disease. Which of the following is correct?

- 1) Adrenalectomy would be the treatment of choice. [0]
- 2) op-DDD is a treatment if unfit for surgery [0]
- 3) Ketoconazole may be used as a treatment if unfit for surgery [100]
- 4) Recurrence of Cushing's disease after transphenoidal surgery is less than 5% [0]
- 5) yttrium implantation is an effective treatment [0]

Transphenoidal hypophysectomy/ adenomectomy would be the initial treatment of choice. Laparoscopic adrenalectomy would be advised where pituitary surgery has failed. Ketoconazole may be an effective treatment for patients unfit for surgery. opDDD is used for adrenal carcinomas. Yttrium implantation has been abandoned even for acromegaly as is pretty useless. The recurrence rate for Cushing's disease

after surgery is of the order of 20-30% in most series and depends on the size of the tumour with macroadenomas having a higher rate of relapse.

89- Oral therapy with which of the following may cause galactorrhoea?

- 1) Bromocriptine [0]
- 2) Cabergoline [0]
- 3) Spironolactone [0]
- 4) Cimetidine [0]
- 5) Domperidone [100]

Domperidone is a dopamine antagonist producing large rises in prolactin concentrations. Spironolactone has no effect on prolactin and Cimetidine produces hyperprolactinaemia only when given IV. Both bromocriptine and cabergoline are dopamine agonists and reduce prolactin.

90- A 54 year old female presents with a neck swelling which has been more noticeable over the last 4 months. Examination reveals a modest goitre and clinically she appears euthyroid. Investigations reveal a T4 of 13.1 pmol/l (NR 9.8 - 23) and a TSH of 3.5 mU/l (NR 0.5 - 4 mU/l). Of the thyroid auto-antibodies, anti -microsomal antibodies are detectable. What is the most probable explanation of this patient's goitre?

- 1) Graves' disease [0]
- 2) Hashimoto's thyroiditis [100]
- 3) DeQuervain's thyroiditis [0]
- 4) Multi-nodular goitre [0]
- 5) Anaplastic thyroid carcinoma [0]

This patient has goitre with elevated microsomal antibodies suggesting a diagnosis of Hashimoto's thyroiditis.

91- A 17 year old female is referred with a six month history of amenorrhoea and weight loss, for which no organic cause can be found. Which of the following features would support a diagnosis of anorexia nervosa?

- 1) Delusions of poisoning [0]
- 2) Hypotrichosis [0]
- 3) Hypergonadotrophic hypogonadism [0]
- 4) Delusion of being overweight [100]
- 5) Watery diarrhoea [0]

Features of AN include a phobic avoidance of normal weight, relentless dieting, self-induced vomiting, laxative use, excessive exercise, amenorrhoea, lanugo hair, hypotension, denial, concealment, overperception of body image, enmeshed families.

92- Which of the following is true of radioactive iodine (¹³¹I) therapy?

- 1) Causes hypothyroidism in 90% of treated patients within 3 months [0]
- 2) Causes a deterioration in ophthalmopathy in patients with Graves disease [100]
- 3) Is associated with a subsequently increased risk of infertility [0]

- 4) Is associated with an increased risk of thyroid lymphoma [0]
- 5) Is the preferred treatment in amiodarone induced thyrotoxicosis [0]

RAI is associated with the induction of hypothyroidism in the majority of subjects by 3 months (70%) with 10% failing at the first dose at about 18 months. It may precipitate deterioration in ophthalmopathy in patients with Graves. There is no evidence of either increased risk of infertility or lymphoma after RAI with evidence suggesting that it is quite safe. Withdrawing amiodarone is the preferred treatment in amiodarone induced thyrotoxicosis and often the iodine uptake would be low in these patients making ^{131}I therapy unhelpful.

93- A 38 year old male presents with gross obesity. What is the average daily energy used by a male of this age?

- 1) 1500 kcal [0]
- 2) 2000 kcal [0]
- 3) 2500 kcal [100]
- 4) 3000 kcal [0]
- 5) 3500 kcal [0]

The average daily energy consumption for a male is 2500 kcal and 2000 kcal for a female. These values are important when determining the dietary calorie restriction.

94- A 36 year old male presents with lethargy. He takes no medication and has generally been otherwise well. Examination reveals that he is obese with a BMI of 36.4 kg/m² and a blood pressure of 120/72. There are no abnormalities of the cardiovascular, respiratory or abdominal systems. Investigations reveal a sodium of 141 mmol/l, a potassium of 2.8 mmol/l, a urea of 5.6 mmol/l and a creatinine of 76 $\mu\text{mol/l}$. What is the most likely diagnosis.

- 1) Conn's syndrome [0]
- 2) Apparent mineralocorticoid excess [0]
- 3) Cushing's syndrome [0]
- 4) Hypokalaemic periodic paralysis [0]
- 5) Bartter's syndrome [100]

Bartter's syndrome is a mixed bag of disorders but most frequently characterised by an autosomal recessive condition consisting of juxta-glomerular cell hyperplasia and secondary hyperaldosteronism. A normal or low blood pressure is typical. It may present in childhood with weakness and failure to thrive but may present co-incidentally in adulthood.

95- Primary hyperparathyroidism may occur in association with the following conditions

- 1) Chronic renal failure [0]
- 2) Vitamin D deficiency [0]
- 3) Gastrinoma [100]
- 4) Autoimmune polyendocrine syndrome [0]
- 5) Sjogren's syndrome [0]

The association of primary hyperparathyroidism and a gastrinoma would suggest a diagnosis of multiple endocrine neoplasia type 1. CRF causes secondary or tertiary hyperparathyroidism, with vit D deficiency causing secondary hyperparathyroidism. There is no association with Sjogren's.

96- A 2 week old male child is brought to casualty by his concerned parents with diarrhoea and vomiting. He is the first child of a young couple. Examination reveals few features besides obvious dehydration. He is noted to have a penile length of 3.5cms. Which of the following is the most appropriate initial treatment for this patient?

- 1) Cow's milk allergy is the most likely diagnosis [0]
- 2) gluten-enteropathy should be excluded [0]
- 3) Requires urgent treatment with oral steroids [0]
- 4) Requires urgent treatment with IV normal saline [100]
- 5) Rota virus gastroenteritis is the most likely diagnosis [0]

The history suggests a diagnosis of classical congenital adrenal hyperplasia which is commonly due to 21 hydroxylase deficiency. A variable presentation is typical but neonatal presentations include salt losing crisis, penile development in the male virilisation and ambiguous genitalia in females. Patients should initially be resuscitated with fluid, usually saline and if suspicious, urgent biochemistry requested for cortisol, 17OHP etc prior to administration of intravenous steroids.

97- A 35 year old male presents with weakness and tiredness. He is noted to be hypertensive. Electrolytes show a hypokalaemia and a hypomagnesaemia. What investigation would you select for this patient?

- 1) Colonoscopy [0]
- 2) Plasma renin to aldosterone ratio [100]
- 3) Serum amylase [0]
- 4) Serum calcium [0]
- 5) Oral glucose tolerance test [0]

The hypokalaemic hypertension with hypomagnesaemia suggests primary hyperaldosteronism. The most reliable assessment for this would be renin to aldosterone ratio.

98- 21 year old woman is known to suffer from anorexia nervosa. Which of the following metabolic disturbances would be a characteristic finding?

- 1) a decrease in Cortisol levels [0]
 - 2) an increase in LH levels [0]
 - 3) hyperkalaemia [0]
 - 4) impaired glucose tolerance [100]
 - 5) raised androgen levels [0]
-

Malnutrition is another cause of diabetes. (Can you name the others? ... Type 1 and Type 2 OK ... but what about gestational or post pancreatitis / pancreatectomy ... do you know the others? Read more ...).

Cortisol and growth hormone levels are elevated.

LH and FSH would be low and LH response to LHRH is impaired when weight loss is severe.

Hypokalaemia (not hyperkalaemia may be seen). Also there may be hypoalbuminaemia, anaemia, leukopenia, and raised serum carotene.

99- Which of the following suggests a poorer prognosis for thyroid cancer.

- 1) Papillary thyroid cancer with cervical node involvement. [0]
- 2) Male sex. [100]
- 3) Age less than 30. [0]
- 4) Cold nodule on thyroid uptake scan [0]
- 5) High TSH concentration [0]

Factors that suggest a poor prognosis in thyroid cancer include increasing age, male sex, poorly differentiated histological features and distant spread.

100- Which of the following features would be expected on lipid analysis in a 57 year old female with two year history of primary biliary cirrhosis?

- 1) A lipaemic appearance of the serum would be expected. [0]
- 2) is treated with clofibrate therapy [0]
- 3) is characteristically associated with tendon xanthomas [0]
- 4) is characteristically associated with palmar xanthomas [100]
- 5) No evidence of a dyslipidaemia would be expected with this short a duration of disease [0]

In prolonged cholestasis features include: increased serum cholesterol, a moderate increase in triglyceride, the serum is not lipaemic, and reduced HDL levels. Clinical features include: palmar xanthomas; tuberous xanthomas (particularly on extensor surfaces); tendinous xanthomas are rare. Xanthomas usually only occur if cholestasis has persisted for more than 3 months sometimes fat deposits may involve bone and peripheral nerves.

101- A 29 year old female presents with headaches. She is noted to be hypertensive with a blood pressure of 180/100 mmHg and initial investigations reveal a hypokalaemia of 2.9 mmol/l. On closer questioning she is found to consume a large quantity of licquorice. Inhibition of which enzyme is responsible for the pseudohyperaldosteronism associated with Liquorice.

- 1) 5 alpha-reductase [0]
- 2) 21 Hydroxylase [0]
- 3) 11 betaHydroxysteroid dehydrogenase (11 bHSD) [100]
- 4) 17 alpha hydroxylase (17aOH) [0]
- 5) 11 beta hydroxylase (11 bOH) [0]

11bHSD is responsible for the conversion of cortisol to the inactive cortisone, preventing activation of the mineralocorticoid receptor by cortisol but permitting activation by aldosterone. Both Liquorice and carbenoxolone inhibit 11bHSD and produce pseudohyperaldosteronism with hypertension and hypokalaemia yet appropriately low renin and aldosterone concentrations. Much research is focussed upon this enzyme of late.

102- Which ONE of the following concerning Insulin is correct?

- 1) acts via a similar mechanism as steroid receptors [0]
- 2) causes an increased glucose-protein transport on the endoplasmic reticulum [0]
- 3) can be detected in the lymph [100]
- 4) interacts with the nuclear membrane [0]
- 5) is synthesised in the alpha cells of islets of Langerhans [0]

a-Cell surface receptors.

Insulin binding to its receptor results in receptor autophosphorylation on tyrosine residues and the tyrosine phosphorylation of insulin receptor substrates (IRS-1, IRS-2 and IRS-3) by the insulin receptor tyrosine kinase. (Read more from the Journal of Cell Science.)p>

e-Beta.

http://www.biochem.wisc.edu/biochem630/readings/21*Insulin_signaling.pdf

103- The thyroid hormone receptor is:

- 1) A gated ion channel [0]
- 2) A cell surface receptor [0]
- 3) A cytoplasmic protein [0]
- 4) A G-protein coupled receptor [0]
- 5) A nuclear receptor [100]

The thyroid hormone receptor is a nuclear receptor. When it binds T3 it is able to bind to the thyroid hormone response element (TRE) in the promoter region of thyroid hormone responsive genes and initiates transcription.

104- A 50-year-old man presents with a diagnosis of acromegaly but has normal visual fields.

Which of the following is the most appropriate treatment for this patient?

- 1) Bromocriptine [0]
- 2) Cabergoline [0]
- 3) Radiotherapy [0]
- 4) Somatostatin analogue therapy [0]
- 5) Trans-sphenoidal hypophysectomy [100]

The most appropriate treatment for acromegaly in this middle-aged man which may prove curative is surgery. Somatostatin therapy, although frequently effective in reducing GH, would not be advocated in this young patient who would require

lifelong therapy.

105- An 18 year old male presented with delayed pubertal development. He had always noted an impaired sense of smell. Examination revealed that his height was on 90th centile and his weight on the 90th centile. His external genitalia showed a small penis with testicular volumes of 3 mL bilaterally and no pubic hair. Investigations revealed: LH concentration 1.0 U/L (1-10), FSH concentration 1.0 U/L (1-7), Serum testosterone 3.0 pmol/L (9-35), Free T4 19 pmol/L (10-22), TSH 3.0 mU/L (0.4-5), CT scan reported as normal. What is the most likely diagnosis?

- 1) Constitutional delay of puberty [0]
- 2) Kallmann's syndrome. [100]
- 3) Klinefelter's syndrome. [0]
- 4) Noonan's syndrome. [0]
- 5) Prader-Willi syndrome. [0]

The combination of hypogonadotrophic hypogonadism and anosmia would suggest a diagnosis of Kallmann's syndrome. This is one of the commonest causes of isolated hypogonadotrophic hypogonadism and is due to a failure of migration of the olfactory neurones and GnRh neurones during development.

106-

- 1) Cushing's syndrome [0]
- 2) Addison's disease [100]
- 3) Conn's syndrome [0]
- 4) Type 1 renal tubular acidosis [0]
- 5) Bulimia nervosa [0]

Her symptoms are suggestive of postural hypotension, which together with hyperkalaemic (and hyponatraemic) acidosis would strongly indicate the presence of Addison's disease. Cushing's and Conn's syndromes are associated with hypertension and hypokalaemia. Hypokalaemia is the most frequent complication of bulimia which may cause cardiac arrhythmias, fits and paraesthesia. Renal tubular acidosis (RTA) is due to inability of the renal tubules to maintain acid-base balance, causing a hyperchloraemia and a normal anion-gap. In type 1 (distal) RTA, there is hypokalaemic acidosis with low urinary ammonium production. Patients present with hyperventilation/acidosis and muscular weakness from hypokalaemia. In type 4 RTA (hyporeninaemic hypoaldosteronism), there is hyperkalaemic acidosis caused by chronic renal insufficiency from diabetes or tubulointerstitial disease.

107- Low uptake of ¹²³I on the thyroid uptake scan would be an expected finding in:

- 1) A solitary toxic nodule [0]
- 2) A multi-nodular toxic goitre [0]
- 3) Amiodarone induced thyrotoxicosis type 1 [0]
- 4) DeQuervain's thyroiditis [100]
- 5) Graves' thyrotoxicosis [0]

DeQuervain's thyroiditis is classically associated with low or absent ¹²³I (the ¹³¹I radioactive isotope of iodine) uptake. The others will have high or normal uptake. In

particular type 1 amiodarone induced thyrotoxicosis may be distinguished from the thyroiditis of type 2 by the normal or high uptake scan.

108- A 40-year-old female, with no prior history of thyroid disease, presents with a 5 day history of an acutely painful, left-sided goitre. Clinically she appeared euthyroid, and was afebrile.

Investigations revealed the following

haemoglobin 13.0 g/dL
white cell count $7.0 \times 10^9/l$
platelet count 200

What is the most likely diagnosis?

- 1) De Quervain's thyroiditis [0]
- 2) Haemorrhage into a cyst [100]
- 3) Hashimoto's thyroiditis [0]
- 4) Staphylococcal abscess [0]
- 5) Thyroid carcinoma [0]

The left side of this patient's goitre becomes acutely swollen with no other signs and FBC is normal which suggests acute haemorrhage into a cyst. Thyroid cancer is usually painless. De Quervain's thyroiditis is a diffusely tender goitre typically with systemic features such as weight loss, pyrexia and a raised ESR.

109- A 53 year old woman presented asking for treatment to prevent osteoporosis. She was one year post-menopausal with a family history of osteoporosis.

Which one of the following therapies would be most appropriate?

- 1) Calcium and vitamin D supplements [0]
- 2) Continuous oestrogen [0]
- 3) Cyclical etidronate and calcium [0]
- 4) Cyclical oestrogen and progestogen [100]
- 5) Vitamin D supplements [0]

This patient with a family history of osteoporosis is one year post-menopausal. Calcium and Vit D supplements with a good diet would be unnecessary and are unproven in this age group. There is no suggestion that she has had a hysterectomy and so an unopposed oestrogen would be contra-indicated. Etidronate is licensed for the prevention of further osteoporotic fractures, prophylaxis against corticosteroid induced osteoporosis and use when HRT is contra-indicated. In this patient's case, and in the absence of any specific contra-indications – Thromboembolic disease, breast Ca, combined HRT would be the treatment of choice.

110- A 48-year-old woman presents to her GP with Cushingoid facies and hyperpigmentation of the skin on her face and chest. She has smoked 20 cigarettes per year for 30 years. Examination reveals no gross abnormalities. Her chest X-ray reveals a 2 cm irregularly shaped mass in the right upper lobe, in proximity to the

mediastinum. A CT guided needle biopsy of the lung lesion is performed. Which would be the most likely cytologic finding?

- 1) Adenocarcinoma [0]
- 2) Benign bronchial adenoma [0]
- 3) Bronchoalveolar cell carcinoma (BAC) [0]
- 4) Small cell (oat cell) carcinoma [100]
- 5) Squamous cell carcinoma [0]

Diabetes

1- According to the new revised criteria for diagnosing diabetes in an asymptomatic patient

- 1) A single fasting venous plasma glucose concentration of > 7 mmol/l can be used to diagnose diabetes [0]
- 2) Two separate fasting venous plasma glucose concentration of > 7 mmol/l is diagnostic of diabetes [100]
- 3) 75 gm oral glucose test is mandatory for diagnosing diabetes [0]
- 4) A fasting venous plasma concentration of < 6.9 can be ignored [0]
- 5) Impaired glucose tolerance is signified by a venous glucose concentration of > 7 mmol and > 11.1 mmol [0]

In an asymptomatic individual, a single sample alone is not sufficient for diagnosis. Diabetes can be diagnosed if separate fasting samples show above 7 mmol/l. 75 gram OGT is still the gold standard for diagnosing diabetes, although fasting glucose can be used, provided adequate fast is ensured. Fasting glucose of above 6.1 but below 6.9 is classed as Impaired Fasting Glycaemia, which a new category of glycaemia. IGT = 7.8 - 11.1

2- Which of the following is true concerning oral hypoglycaemic agents?

- 1) Acarbose promotes insulin secretion in response to meals [0]
- 2) Chlorpropamide induces liver enzymes [0]
- 3) Glibenclamide is excreted unchanged by the kidney [0]
- 4) Gliclazide inhibits gluconeogenesis [0]
- 5) Metformin inhibits hepatic gluconeogenesis [100]

Chlorpropamide like all the other sulphonylureas stimulate pancreatic insulin secretion. They undergo hepatic metabolism then renal excretion. Acarbose is an alpha glucosidase inhibitor which inhibits the splitting of disaccharides into glucose and so inhibits glucose absorption from the gut. Metformin is an insulin sensitiser and although its actions are not fully understood its main role appears to be through inhibition of hepatic gluconeogenesis.

3- A previously well 60 year old lady is admitted with an Acute Anterior Myocardial Infarction. A random blood glucose concentration was found to be 12.1 mmol/L (< 6.7).

What is the optimal management of her blood sugar?

- 1) Diet [0]

- 2) Gliclazide [0]
- 3) Intravenous insulin plus dextrose [100]
- 4) Metformin [0]
- 5) Subcutaneous insulin [0]

The DIGAMI study has demonstrated that there is a survival advantage in initially treating such patients with elevated glucose concentrations with sliding scale insulin for 24 hours post-infarct and then switching to three months subcutaneous insulin. (Almbrand B, Johannesson M, Sjostrand B, Malmberg K, Ryden L. Cost Effectiveness of Intense Insulin Treatment after Acute Myocardial Infarction in Patients with Diabetes Mellitus. Results from the DIGAMI study Eur Heart J 2000; 21: 733-39)

4- A 32 year old male physical education teacher has a 3 year history of type 1 diabetes. At the last annual review, his HbA1c was 6.8% but he complains of hypoglycaemic events particularly during exercise. He has been commenced on the insulin analogue - Lispro insulin. Compared with conventional short-acting insulins what is the advantage of insulin analogue therapy?

- 1) Significant improvement in HbA1c [0]
- 2) Reduces post-prandial glucose concentrations [100]
- 3) Reduces the incidence of long-term diabetic complications [0]
- 4) Reduces the incidence of hypoglycaemic events [0]
- 5) Longer duration of action [0]

The short acting Insulin analogue, Lispro has a rapid onset of action and a shorter duration of action than conventional short acting soluble insulins. Consequently studies reveal reduced post-prandial glucose concentrations versus soluble insulin and potentially a reduced incidence of hypoglycaemia.

5- A diagnosis of diabetes mellitus is being considered in 32-year-old woman who is 16 weeks pregnant. Her body mass index (BMI) was 22 kg/m² (18 - 25). A 75g oral glucose tolerance test was reported as follows

time Plasma glucose concentration Normal range

0 hr 6.0 mmol/l 3.0-6.0

2hr 12.5 mmol/l <11.1

Which of the following is the most appropriate next step in the management of this patient?

- 1) Glipizide therapy [0]
- 2) Insulin therapy [100]
- 3) Low calorie diet [0]
- 4) Metformin therapy [0]
- 5) Repeat OGTT in four weeks [0]

The result confirms a diagnosis of gestational diabetes mellitus with the 2hr OGTT result above 11.1 mmol/l. To minimise the fetal consequences of GDM (macrosomia,

fetal malformations, still birth, IUGR etc), the patient's glycaemia should be strictly controlled with insulin. A low calorie diet is inappropriate and neither metformin nor glipizide are licenced for use in pregnancy. There is no point in repeating the OGTT in 4 weeks as control is required NOW.

6- An asymptomatic 56 year old man with a family history of type 2 diabetes was found to have a fasting venous glucose of 6.5 mmol/l.

- 1) He has impaired glucose tolerance [0]
- 2) This does not need further investigation [0]
- 3) He should be investigated further by another fasting venous sampling [0]
- 4) 75 gm oral glucose tolerance test is the best way of excluding diabetes in this case [100]
- 5) He should be treated with oral hypoglycaemics in the first instance [0]

According to the new revised criteria for the diagnosis of diabetes, venous plasma glucose (VPG) of 6.1 - 6.9 is categorised as Impaired Fasting Glycaemia and requires further assessment with a 75 gram oral glucose tolerance test (OGT) which is still the gold standard. A 2 hour value of equal to or over 11.1 mmol/l is diagnostic of diabetes. Impaired glucose tolerance is a 2 hour VPG of 7.8 - 11.1 during an OGT. Initial treatment of type 2 diabetes is patient education, diet and lifestyle changes

7- A 36-year-old male with insulin-dependent diabetes mellitus of three years duration presented with decreased libido and erectile dysfunction since diagnosis. No abnormalities were noted on genital examination. Investigations revealed:

plasma testosterone 6.0 nmol/L (9 - 35)
plasma follicle stimulating hormone 1.0 u/L (1-8)

Which of the following investigations is most appropriate next step?

- 1) autonomic function testing [0]
- 2) Doppler studies of penile artery [0]
- 3) Nerve conduction studies [0]
- 4) Serum ferritin [100]
- 5) Serum prolactin [0]

This IDDM patient appears to have hypogonadotrophic hypogonadism (HH) as reflected by low testosterone and low FSH. The combination is compatible with a diagnosis of haemochromatosis and measuring ferritin would be a reasonable investigation. Haemochromatosis typically causes hypogonadotrophic hypogonadism as a consequence of the ferritin deposition within the pituitary rather than primary testicular dysfunction. Autonomic nerve dysfunction is one of the commoner causes of impotence in a diabetic but in this case is not the cause of his HH. For similar reasons, both nerve conduction studies and dopplers are irrelevant. Prolactin would be a sensible measurement but probably if you were looking to confirm a diagnosis that incorporates the diabetes as well, Ferritin would be the investigation of choice.

8- A 59 year old woman has had insulin dependent diabetes mellitus for over two decades. The degree of control of her disease is characterized by the laboratory

finding of a HbA1c of 10.1%. She complains of repeated episodes of abdominal pain following meals. These episodes have become more frequent and last for longer periods over the last couple of months.

On physical examination, there are no abdominal masses or organomegaly and no tenderness to palpation.

Which of the following findings is most likely to be present?

- 1) Acute pancreatitis [0]
- 2) Chronic renal failure [0]
- 3) Hepatic infarction [0]
- 4) Mesenteric artery occlusion [100]
- 5) Ruptured aortic aneurysm [0]

Diabetes- especially Type 2 diabetes- is associated with macrovascular disease. Smoking is a further risk factor for macrovascular atherosclerosis. After a meal splanchnic blood flow is increased. If the mesenteric artery is occluded the lack of blood flow to the bowel will produce ischaemic type pain. Chronic renal failure may be present but would not cause post prandial pain. Ruptured aortic aneurysm would normally present acutely with hypotension, cold lower limbs with reduced pulses and a pulsatile, tender abdominal mass. Pancreatitis is unlikely given the history and the lack of epigastric tenderness. Hepatic infarction should lead to right upper quadrant pain.

9- A 72 year old male presents with a 2 month history of weight loss and weakness. Examination reveals a BMI of 24.5 kg/m² and a blood pressure of 146/90 mmHg. Examination of the lower limbs reveals a bilateral weakness of knee flexion. He is unable to rise from the squatting position. There is absence of the knee reflex but the ankle reflexes are preserved and both plantars are flexor. There are no abnormalities on sensory examination.

Which of the following tests may be diagnostic?

- 1) Vitamin B12 concentration [0]
- 2) Thyroid function test [0]
- 3) Oral glucose tolerance test [100]
- 4) Urine free cortisol concentration [0]
- 5) Vitamin D concentration [0]

This patient presents with weight loss, and reduced quadriceps strength, bilaterally with absent knee reflexes. This is a typical presentation of diabetic amyotrophy. Osteomalacia, hyperthyroidism and Cushing's would be unlikely as the proximal myopathy involves quadriceps and hamstrings and knee reflexes would be preserved. Subacute combined degeneration of the cord does not present with such features.

10- A 16 year old male with a day history of malaise, weakness and vomiting. He was diagnosed with Insulin dependent diabetes mellitus 3 years previously. Which ONE of the following supports a diagnosis of diabetic ketoacidosis:

- 1) Abdominal pain at onset [0]
- 2) A serum bicarbonate of 10 mmol/l [100]

- 3) A serum glucose 14 mmol/l [0]
- 4) Decreased appetite in the past few days [0]
- 5) Shallow respirations [0]

a-An unusual but recognised feature particularly in children. However does not support a diagnosis of DKA. b-Suggests metabolic acidosis. c-'Normoglycaemic DKA' can occur and a glucose of 14 doesn't rule out the diagnosis but it does not support the diagnosis. d-Usually patients are unwell with infections and anorexia. e-Respiratory compensation leads to rapid deep (Kussmaul's) breathing. (Dr Mike Mulcahy)

11- Which of the following is true concerning a 68 year old male with type 2 diabetes diagnosed with type IV renal tubal acidosis?

- 1) Aminoaciduria would be expected. [0]
- 2) Fludrocortisone treatment is effective [100]
- 3) Increased Glomerular filtration rate is expected. [0]
- 4) Increased urinary bicarbonate would be expected. [0]
- 5) Normal renal handling of K⁺ and H⁺ [0]

H⁺ secretion, sodium reabsorption and ammonia production diminishes. RTA 4 is in effect hyporeninaemic hypoaldosteronism or failure of aldosterone action and thus helped treated with mineralocorticoids. It is usually seen in chronic renal disease and hence low GFR and particularly. Aminoaciduria and increased urine bicarbonate are features of RTA types 1 and 2.

12- A 45 year old male type 1 diabetic with a number of complex diabetic gastrointestinal complications is noted to have a PR interval of 0.18s, a QRS duration of 0.1s and a QT interval of 0.48s on routine ECG. Which of the following drugs may be responsible?

- 1) Cisapride [100]
- 2) Octreotide [0]
- 3) Co-trimoxazole [0]
- 4) Domperidone [0]
- 5) Cimetidine [0]

Cisapride has been withdrawn due to the problem of prolonged QT interval and torsades de pointe. Prolonged QT is defined as greater than 0.45s. Other agents include amitriptyline and pheothiazines yet metoclopramide and domperidone are not associated.

13- When considering diabetic retinopathy which of the following statements is most accurate:

- 1) Microaneurysms represent sacular dilatation of retinal arterioles [0]
- 2) Hard exudates represent calcium deposits in the retina [0]
- 3) Cotton wool spots represent infarcts of the nerve fibre layer of the retina [100]
- 4) Haemorrhages close to the fovea are not potentially sight threatening [0]
- 5) Laser photocoagulation is applied directly to new vessels to destroy them [0]

MAs are capillary aneurysms. HEs are collections of exudated lipid and protein. C is correct, multiple CWS are a pre-proliferative sign. Haemorrhages (or HEs) close to the fovea represent a risk of macular oedema and are therefore sight threatening. Laser destroys ischaemic but viable retina to reduce the secretion of angiogenic growth factors and allow new vessel regression, it is not applied directly to new vessels as this would cause bleeding.

14- With respect to lipoprotein transport and metabolism in the body, the following statements are correct EXCEPT:

- 1) Arterial walls contain cells with LDL receptors. [0]
- 2) Cholesterol is required for the formation of red blood cell membranes. [0]
- 3) Chylomicrons are synthesized in the liver. [100]
- 4) HDL is assembled in the extracellular space. [0]
- 5) VLDL transformation to LDL occurs in adipose tissue. [0]

Chylomicrons are formed in the gut from exogenous triacylglycerols and cholesterol. They are released into the lymph and thereby enter the blood. They are not formed in the liver.

15- Which of the following concerning Diabetic retinopathy is correct?

- 1) Is unusual in type 2 diabetic patients [0]
- 2) Improved glycaemic control is more effective than hypertensive control in reducing progression of disease. [0]
- 3) Normal visual acuity is seen in Proliferative retinopathy. [100]
- 4) Progression may be reduced with statin therapy [0]
- 5) Soft exudates are a feature of background retinopathy. [0]

Diabetic retinopathy occurs in both type 1 and 2 DM and may be a presenting feature in Type 2 as the condition may have existed for many years prior to diagnosis. Progression may be slowed with improved glycaemic and hypertensive control but the latter has been shown to be more effective at reducing progression (UKPDS). There are no data at present to suggest that Statin therapy reduces disease progression. Soft exudates are a feature of pre-proliferative Rn and despite quite marked new vessel disease the visual acuity may be normal.

16- A 19 year old type 1 diabetic presents for annual review. He takes three times daily short acting insulin with evening dose long acting insulin. His glycaemic control is good and his HbA1c is 6.5%. He seeks advice regarding future career. Which of the following occupations would he be able to pursue?

- 1) A chef in the army catering corps [0]
 - 2) A steward on board a cruise liner [0]
 - 3) A oil rig engineer [0]
 - 4) A police officer [0]
 - 5) An airline steward [100]
-

Any employment in the armed forces, fire service or police force is not permissible unless already a member of the armed forces. Offshore work again is not an option.

17- In active acromegaly with associated diabetes mellitus which of the following findings would be expected?

- 1) Diabetes mellitus is due to an auto-immune process [0]
- 2) Growth hormone concentrations are suppressed with hyperglycaemia [0]
- 3) IGF-1 concentrations are low [0]
- 4) There is insulin resistance [100]
- 5) Treatment with a somatostatin analogue is contra-indicated [0]

Insulin resistance stems from the excessive growth hormone concentrations (anti-insulin effects) that of course fail to suppress with hyperglycaemia. Acromegaly is often effectively treated with somatostatin analogues which may improve glycaemic control. Many of the effects of GH are mediated through IGF-1 whose concentrations are high in acromegaly. Diabetes mellitus is due to the insulin resistance and is not due to auto-immune insulinitis.

18- A 30 year old lady with long standing Type I diabetes presents with a 3 month history of pain and stiffness of the right shoulder. Passive and active movements of the shoulder are equally restricted. What is the most likely diagnosis?

- 1) Rheumatoid arthritis [0]
- 2) Osteoarthritis [0]
- 3) Calcific tendinitis [0]
- 4) Pyrophosphate arthropathy (pseudogout) [0]
- 5) Adhesive capsulitis [100]

Adhesive capsulitis (frozen shoulder) is strongly associated with diabetes with as many as 40% of patients developing this problem at some stage. The restricted active and passive movements confirm that this patient's problems are either capsular or articular in origin rather than periarticular tendon problems where active movements are generally more restricted than passive movements. The shoulder joint is rarely affected by primary osteoarthritis.

20- Which ONE of the following concerning Insulin is correct?

- 1) acts via a similar mechanism as steroid receptors [0]
- 2) causes an increased glucose-protein transport on the endoplasmic reticulum [0]
- 3) can be detected in the lymph [100]
- 4) interacts with the nuclear membrane [0]
- 5) is synthesised in the alpha cells of islets of Langerhans [0]

a-Cell surface receptors.

Insulin binding to its receptor results in receptor autophosphorylation on tyrosine residues and the tyrosine phosphorylation of insulin receptor substrates (IRS-1, IRS-2 and IRS-3) by the insulin receptor tyrosine kinase. (Read more from the Journal of Cell Science.)p>

e-Beta.

21- You are consulted by a 52 year old man with type 2 diabetes diagnosed for 1 year. His blood pressure is 156/88, his cholesterol is 5.3mmol/l, he has a BMI of 29 and does not smoke. His HbA1c is 7.9%, he currently takes only Metformin 500mg bd. The single intervention most likely to reduce his overall risk of microvascular and macrovascular events is:

- 1) Statin therapy [0]
- 2) Sulphonylurea therapy [0]
- 3) Antihypertensive therapy [100]
- 4) Weight reduction [0]
- 5) Aspirin therapy [0]

The UKPDS showed that effective antihypertensive therapy reduced the risk of cardiovascular events and microvascular complications. Lowering HbA1c only resulted in a significant reduction in microvascular events. Lipid lowering therapy benefits patients with diabetes as much as those without diabetes in preventing macrovascular events in sub group analyses but has no effect on microvascular events demonstrated so far. Aspirin is recommended to type 2 patients with one other cardiovascular risk factor but there is little trial evidence of efficacy. Weight reduction may reduce progression to overt diabetes from states of impaired glucose tolerance but has not been demonstrated to reduce microvascular risk in diabetes.

22- Which of the following is true regarding diabetic foot ulceration?

- 1) Autonomic neuropathy results in increased resting blood flow [0]
- 2) Callus formation at pressure areas is an important predictor of ulceration [100]
- 3) Plantar ulceration is most commonly due to atherosclerosis. [0]
- 4) Skin infection is the most common initiating event in ulceration. [0]
- 5) Radiography can readily distinguish between Charcot's joint and osteomyelitis. [0]

Callus formation at pressure areas is an important predictor of potential ulceration. Plantar ulceration is usually a consequence of neuropathy and minor skin trauma is probably the most common initiating event. Blood flow is often decreased with autonomic neuropathy hence sympathectomy may be performed to improve skin blood flow. It is difficult to radiographically distinguish between Charcot's joint and osteomyelitis.

23- A 44-year-old woman with type 1 diabetes mellitus has not attended the diabetic clinic for 5 years. Her HbA1c is 10.1%. Examination shows no abnormalities. Her hemoglobin level is 9 g/dL, hematocrit is 28%, and mean corpuscular volume is 94 mcm³. A blood smear shows normochromic, normocytic anaemia. Which of the following is the most likely cause?

- 1) acute blood loss [0]
- 2) chronic lymphocytic leukaemia [0]
- 3) erythropoietin deficiency [100]
- 4) microangiopathic haemolysis [0]
- 5) sideroblastic anaemia [0]

The most likely cause is progressive renal failure which leads to reduced release of erythropoietin from the kidneys. Sideroblastic anaemia (myelodysplasia) is seen in older age groups. CLL or microangiopathic haemolysis are possible causes but unlikely.

24- A 50 year old man with a history of Diabetes Mellitus and hypertension attends an ophthalmic clinic for regular assessment. On fundoscopy he is diagnosed to have preproliferative diabetic retinopathy. Which of the following is characteristic of preproliferative diabetic retinopathy?

- 1) Cotton Wool Spots [0]
- 2) Microaneurysms [0]
- 3) Hard Exudates [0]
- 4) Venous Beading [100]
- 5) Macular Odema [0]

B,C and E suggests background diabetic retinopathy. A suggests either diabetic or hypertensive retinopathy. D is characteristic for preproliferative diabetic retinopathy.

25- Which of the following is the oral hypoglycaemic agent Rosiglitazone?

- 1) A Peroxisome Proliferator Activating Receptor (PPAR)-alpha agonist [0]
- 2) A Peroxisome Proliferator Activating Receptor (PPAR)-gamma agonist [100]
- 3) A Sulphonylurea [0]
- 4) A Biguanide [0]
- 5) An alpha-Glucosidase inhibitor [0]

Rosiglitazone is a new class of oral hypoglycaemic agent being a PPAR gamma agonist. Through activation of this receptor it modulates adipocyte function and improves insulin sensitivity.

26- A 75 year old man is admitted with a blood sugar of 40 mmol/l and lobar pneumonia and dies despite treatment. Post-mortem examination reports the presence of amyloid polypeptide on pancreatic histology. This would suggest

- 1) that he has type 2 diabetes [100]
- 2) that he has type 1 diabetes [0]
- 3) that he has diabetes secondary to amyloidosis [0]
- 4) that he has chronic pancreatitis as a cause of diabetes [0]
- 5) this can be a non-specific finding [0]

The presence of amyloid polypeptide on pancreatic histology is highly suggestive of type 2 diabetes. Although the primary defect in type 2 diabetes is insulin resistance, loss of insulin secretory function over time does occur in type 2 diabetic patients, and reduction in beta cell mass due to amyloid deposition may partly account for this.

27- An 16-year-old man presents with polyuria and polydipsia. Which of the following may confirm the diagnosis of diabetes mellitus?

- 1) A random plasma glucose of >7.5 mmol/L [0]
- 2) A finding of 3+ ketonuria [0]
- 3) An HbA1c of 7.0% [0]
- 4) A fasting plasma glucose of 7.5 mmol/L [100]
- 5) An abnormal glucose tolerance test [0]

The diagnosis is usually relatively easy to confirm in a symptomatic subject. A random glucose of >11.1 mmol/L or a fasting glucose of >7.0 mmol/L would be regarded as confirmatory. There is usually glycosuria in addition to ketonuria. Isolated ketonuria suggests fasting. A raised glycosylated haemoglobin (HbA1c) is also highly suggestive but not diagnostic. A glucose tolerance test is rarely needed.

Gastroenterology

1- A 24 year old woman had ulcerative colitis for seven years and was prescribed mesalazine 1.5 g per day. She smoked 20 cigarettes per day and was 10 weeks pregnant. She complained of worsening symptoms with six bloody stools per day. Which one of the following statements is correct?

- 1) Azathioprine is contraindicated. [0]
- 2) Initiation of an elemental diet risks fetal malnutrition. [100]
- 3) Oral corticosteroids are contraindicated. [0]
- 4) Oral mesalazine therapy should be withdrawn. [0]
- 5) Termination of the pregnancy is advisable. [0]

The effect of pregnancy on UC is variable. Oral corticosteroids and mesalazine are not contraindicated. In general, the health of a mother with UC is the best predictor of the outcome of the pregnancy. Hence drug treatment is preferred to leaving active disease untreated. The BNF states that azathioprine should not generally be started during pregnancy, but it is not contraindicated. However, azathioprine is concentrated in breastmilk. In the context of pregnancy, an elemental diet does risk maternal and fetal malnutrition.

2-Which of the following features would be expected on lipid analysis in a 57 year old female with two year history of primary biliary cirrhosis?

- 1) A lipaemic appearance of the serum would be expected. [0]
- 2) is treated with clofibrate therapy [0]
- 3) is characteristically associated with tendon xanthomas [0]
- 4) is characteristically associated with palmar xanthomas [100]
- 5) No evidence of a dyslipidaemia would be expected with this short a duration of disease [0]

In prolonged cholestasis features include: increased serum cholesterol, a moderate increase in triglyceride, the serum is not lipaemic, and reduced HDL levels. Clinical features include: palmar xanthomas; tuberous xanthomas (particularly on extensor surfaces); tendinous xanthomas are rare. Xanthomas usually only occur if cholestasis

has persisted for more than 3 months sometimes fat deposits may involve bone and peripheral nerves

3- A 55 year-old man on no current treatment for his quiescent ulcerative colitis is found to have a raised ESR.

Investigations show:

Haemoglobin 13.2g/L

WCC 4.5

PLT 160

Corrected Calcium 2.58

IgG 25 (6-13)

IgA 1.8 (0.9-3)

IgM 1.6 (0.4-2.2).

What is the most appropriate next investigation?

- 1) Bone marrow trephine and aspiration. [0]
- 2) Isotope bone scan. [0]
- 3) Plasma immunoelectrophoresis. [100]
- 4) Rectal biopsy. [0]
- 5) X-Ray Skeletal survey. [0]

The ESR is not raised in quiescent UC. Hence, there must be another reason in this case. The only abnormal result given is a raised IgG. This suggests that myeloma is the diagnosis. Plasma immunoelectrophoresis, to look for an M band, is the most appropriate next investigation. A bone marrow trephine is the definitive investigation but is traumatic and painful to the patient and so is not the next investigation of choice.

4- Which ONE of the following statements regarding colon cancer is correct:

- 1) In non-familial cases, gene mutations in the cancer cells are unusual [0]
- 2) In familial cases the inheritance pattern is typically autosomal recessive [0]
- 3) It occurs most commonly in the ascending colon [0]
- 4) It is a characteristic feature of the Peutz-Jegher syndrome [0]
- 5) In familial polyposis coli the increased cancer risk is due to inheritance of a mutated suppressor gene [100]

A – Quantitative and qualitative alterations in gene expression accumulate in colorectal cancer cells. These include alterations of pro-oncogene expression and chromosomal abnormalities (deletions at 17p and 18q are seen in 70% of colorectal carcinomas). B – Both familial polyposis coli and Gardner's syndrome are autosomal dominant. C – The rectum and sigmoid colon are the commonest sites. D – Peutz-Jegher's syndrome is dominantly inherited pigmentation of skin and mucuous membranes, and hamartomatous polyps in the stomach and larger intestine. The polyps only rarely undergo malignant change. E – An allelic deletion of a putative tumour suppressor gene on 5p.

5- A 40-year-old man has a history of left-sided Crohn's colitis. Though, previously treated with steroids and mesalazine, he has had several relapses in the past year. The last relapse, treated with high doses of steroids, was complicated by gastric bleeding.

Investigations show:

Haemoglobin 10.8 g/L (13.0-18.0)
MCV 76 fL (80-96)
MCH 24 pg (28-32)
White cell count $10 \times 10^9/L$ (4-11)
Platelets $400 \times 10^9/L$ (150-400)
Serum total protein 70 g/L (61-76)
Serum albumin 30 g/L (37-49)
Serum CRP 30 mg/L(<10)
Abdo X-ray normal

Which of the following is the most appropriate management?

- 1) A trial of oral metronidazole for three months. [0]
- 2) Total colectomy with ileostomy construction. [0]
- 3) Total colectomy with pouch construction. [0]
- 4) Treatment with azathioprine. [100]
- 5) Treatment with oral budesonide. [0]

This patient has all the hallmarks of active Crohn's colitis that is failing to settle with first-line medical therapy. The next step is a trial of azathioprine, which is used as a steroid-sparing agent. This is particularly relevant to this particular patient, as he has had a serious side-effect from previous steroid treatment. Metronidazole is rarely effective in the treatment of active Crohn's colitis. Given that Crohn's disease can recur following surgery, an operation should not be embarked upon without first a trial of the second-line medical therapies such as azathioprine, its metabolite 5-mercaptopurine, or infliximab.

6- A 45 year old man was receiving phenytoin for long-standing epilepsy. He admitted to heavy alcohol consumption. Examination revealed no focal or neurological signs, 3cm hepatomegaly but no splenomegaly. Investigations showed:

Haemoglobin 10.0 g/dL (13-18), MCV 122 fL (80-96), White cell count $2.2 \times 10^9/L$ (4-11), Platelet count $90 \times 10^9/L$ (150-400).

What is the most likely explanation for these results?

- 1) Alcoholic liver disease. [100]
- 2) Aplastic anaemia. [0]
- 3) Folate deficiency. [0]
- 4) Hypothyroidism. [0]
- 5) Scurvy. [0]

The salient features are no abnormal neurology (which would argue against hypothyroidism (slow relaxation of reflexes)), a mild pancytopenia with increased MCV and hepatomegaly. The most likely cause for these features is chronic alcohol

abuse. Folate deficiency could contribute to the macrocytic anaemia but would not be associated with the hepatomegaly nor leucopaenia/thrombocytopaenia. Scurvy/vitamin C deficiency is associated with bleeding gums, corkscrew hairs, petechiae and a neuropathy. A far more profound pancytopenia would be expected with marrow aplasia.

7- A 60-year-old woman with known alcoholic liver cirrhosis presents with vague abdominal pains, malaise and nausea. She has been abstinent since she was diagnosed eight months ago. On examination she had moderate ascites and mild, generalised abdominal tenderness.

Investigations

Haemoglobin 11.2 g/dL (11.5 - 16.5)

WCC $15 \times 10^9/L$ (4 - 11)

prothrombin time 21 s (<15s)

serum albumin 28 g/L (37 - 49)

serum total bilirubin 56 micromol/L (1 - 22)

ascitic fluid protein 26 g/L

ascitic fluid amylase normal

ascitic fluid white cell count $500 \times 10^9/L$

What is the most likely reason for her current problem?

- 1) hepatic vein thrombosis [0]
- 2) pancreatic pseudocyst rupture [0]
- 3) portal vein thrombosis [0]
- 4) primary liver cancer [0]
- 5) spontaneous bacterial peritonitis [100]

The high white cell count in the ascites makes spontaneous bacterial peritonitis (SBP) much more likely than Budd Chiari Syndrome (BCS), PVT, HCC, or a ruptured pancreatic pseudocyst. Abdominal pain is often only mild, or even absent in SBP, with patients often presenting with otherwise unexplained hepatic decompensation.

8- A 32-year-old man develops profuse diarrhoea with mucus and blood. Biopsies from the flexible sigmoidoscopy shows evidence of ulcerative colitis. Which of the following is true of the condition?

- 1) mesalazine therapy is associated with infertility in males [0]
- 2) pseudopolyps on sigmoidoscopic examination have premalignant potential [0]
- 3) topical 5-aminosalicylic acid are less effective than topical steroids in proctitis [0]
- 4) colectomy may produce regression of gall bladder disease [100]
- 5) goblet cells are unaffected in the mucosa [0]

Mesalazine is 5-aminosalicylic acid. Sulphasalazine is the combination of 5-ASA and sulphapyridine, the latter being a sulphonamide and causing oligospermia. Pseudopolyps are not premalignant and may occasionally regress. Topical 5-aminosalicylic acid are as effective as topical steroids in proctitis. Goblet cells are depleted in the mucosa.

9- Which ONE of the following statements is true of autoimmune hepatitis:

- 1) It usually presents as an acute hepatitis [0]
- 2) It rarely presents before 20 years of age [0]
- 3) It may be associated with keratoconjunctivitis sicca [100]
- 4) It is associated with hypogammaglobulinaemia [0]
- 5) It rarely interferes with menstruation except in later stages [0]

It occurs frequently in young (10-20 years) and middle-aged women. 25% present as acute hepatitis, but usually the onset is insidious. Some may be asymptomatic for years and then are found to have signs of chronic liver disease. Amenorrhoea is common. It is associated with hyperglobulinaemia and other autoimmune disease. 60% are associated with HLA-B8, DR3 and Dw3. The sicca syndrome (xerostomia/dry eyes, keratoconjunctivitis sicca) may occur.

10- Compared with bottle feeding, breast feeding is relatively protective against which of the following?

- 1) Late haemorrhagic disease of the newborn [0]
- 2) Maternal breast cancer [100]
- 3) Late onset diabetes [0]
- 4) Prolonged jaundice [0]
- 5) Under-feeding [0]

Breast fed infants have a reduced risk of infection, though the effect is less in industrialised societies. The protective effect is increased for low birth weight infants. There may also be improved cognitive and psychological development, reduced risk of juvenile onset diabetes, and reduced risk of maternal breast cancer. Disadvantages of breast feeding includes social limitations, unrecognised under-feeding (rare), late haemorrhagic disease of the newborn, and breast milk jaundice.

11- A 28 year old male presents with a four day history of profuse bloody diarrhoea after returning from a holiday in the Far East. Which of the following regarding his illness is true?

- 1) a negative amoebic fluorescent antibody test excludes a diagnosis of acute amoebic dysentery [100]
- 2) Cysts to *E. histolytica* in the stools confirms a diagnosis of acute amoebic dysentery [0]
- 3) cholera is a likely diagnosis [0]
- 4) Giardiasis is a likely diagnosis [0]
- 5) shigellosis is a likely diagnosis [100]

Shigellosis is a possible cause of profuse bloody diarrhoea as cholera and giardiasis are associated with watery diarrhoea. Trophozoites seen in acute amoebic dysentery, and the test is not 100% sensitive.

12- A 63 year old patient with known alcohol related cirrhosis presented with ascites, abdominal tenderness and peripheral oedema. A diagnostic tap revealed a neutrophil count of 400/mm³ (normal <250mm³).

Which of the following would be of most immediate benefit?

- 1) fluid restriction and a no added salt diet [0]
- 2) intravenous antibiotics [100]
- 3) oral spironolactone [0]
- 4) therapeutic paracentesis [0]
- 5) trans-jugular intrahepatic porto-systemic shunt [0]

This man has spontaneous bacterial peritonitis (SBP). Appropriate treatment is IV antibiotics. He is likely to have a decreased intravascular volume and require IV albumin as volume expansion. Fluid restriction, diuretics, or large volume paracentesis are likely to cause further hypovolaemia and precipitate renal failure. There is no stated indication for a TIPSS, indications are: diuretic resistant ascites, intractable portal hypertensive bleeding and hepato-renal failure.

13- A 29-year-old man presents with anaemia, bleeding tendency, diarrhoea and abdominal pain. Examination reveals a palpable mass in the right lower quadrant and anal skin tags. What is the most likely underlying condition?

- 1) chronic pancreatitis [0]
- 2) coeliac disease [0]
- 3) crohn's disease [100]
- 4) intestinal lymphoma [0]
- 5) ulcerative colitis [0]

Crohn's disease commonly presents with diarrhoea, abdominal pain and weight loss. It can affect the whole gastrointestinal tract, the commonest being ileocolitis. Anaemia is usually due to blood loss and less commonly B12/folate malabsorption. An abdominal mass is often palpable in presence of small bowel disease, which can lead to Vitamin K malabsorption. Anal tags, fissures, perianal fistulae and abscesses are associated with crohn's disease and not ulcerative colitis.

14- Ten individuals are admitted to casualty with profuse vomiting after attending a retirement dinner in a chinese restaurant. They all ate at roughly 7 pm and became ill at roughly midnight. Nine ate a mixture of dishes except one female who ate vegetarian dishes with her rice. What is the most likely infective organism?

- 1) Salmonella enteritidis [0]
- 2) Staphylococcus aureus [0]
- 3) E. Coli [0]
- 4) Clostridium perfringens [0]
- 5) Bacillus cereus [100]

This is a typical case of Bacillus cereus, with profuse vomiting which occurs approx 1-5 hrs after eating. In this case it is likely that the rice itself had been infected. Another possibility is Staph. aureus although this is less likely.

15- Which of the following is activated by Cholera toxin?

- 1) Adenylate cyclase [100]

- 2) Guanylate cyclase [0]
- 3) Peroxisome proliferator receptor (PPAR) gamma [0]
- 4) Sodium/potassium ATPase [0]
- 5) The glucose-sodium transporter [0]

Cholera toxin activates adenylate cyclase with generation of cAMP.

16- Which of the following is NOT true of a patient with ascites due to liver cirrhosis:

- 1) Spontaneous bacterial peritonitis is a recognised feature [0]
- 2) The usual source of the ascitic fluid is mainly from the exudation from the surface of the liver [100]
- 3) Hepatic intrasinusoidal pressure is elevated [0]
- 4) Urinary sodium concentration is usually less than 10 mmol/l [0]
- 5) Cardiac output is often elevated [0]

Hepatocellular failure is associated with hyperdynamic circulation and systemic vasodilatation, with increased vascular capacitance. Most patients have sodium and water retention.

17- A 35-year-old woman with a history of recurrent anaemia was noted to have target cells and Howell-Jolly bodies on a blood film examination.

Investigations revealed:

Haemoglobin 7.0 g/dL (11.3-16.5)

MCV 77 fl (80-96)

MCH 26.2 pg (28-32)

Serum B12 140 ug/L (160-760)

Red cell folate 95 ug/L (160-640)

Serum ferritin 10 ug/L (15-300)

What disease specific antibody is most likely to be present?

- 1) Anti-endomysial [100]
- 2) Anti-gastric parietal cell [0]
- 3) Anti-glutamic acid decarboxylase [0]
- 4) Anti-intrinsic factor [0]
- 5) Antimitochondrial [0]

The patient has hyposplenism as suggested by the blood film and a mixed anaemia. Coeliac disease could therefore fit the above picture with anti-endomysial antibodies being the most appropriate selection from the above list. Antimitochondrial antibodies are seen in PBC, anti-gastric and anti intrinsic Abs are seen in pernicious anaemia. Anti-GAD abs are found in auto-immune DM.

Screening for coeliac disease should include high-risk groups such as anaemia (iron or folate deficiency), hyposplenism, reduced bone density and infertility.

"Anti-endomysial IgA antibodies are extremely specific markers for CD and for dermatitis herpetiformis. These antibodies are directed to a component of the gut

endomysium (connective tissue surrounding smooth muscle fibers of the gut)."

(Further reading)

http://www.labodia.com/en/celiac_disease/review_coeliac_english.htm#antibodytesting

18- Which one of the following is a feature of the VIPoma syndrome?

- 1) Alkalosis [0]
- 2) Hypoglycaemia [0]
- 3) Hypokalaemia [100]
- 4) Increased gastric acid secretion [0]
- 5) Provocation of VIP release by somatostatin [0]

a, b,d,e: All opposite to what is expected. VIPOMA -Features vasoactive intestinal polypeptide secreting tumour, mainly pancreas rarely ganglioneuroblastoma (sympathetic chain or adrenal cortex), secretory diarrhoea ('pancreatic cholera'), weight loss, dehydration, abdominal colic, cutaneous flushing, raised plasma VIP, urea+Calcium, raised plasma pancreatic polypeptide, hypokalaemic acidosis (loss of alkaline secretions), achlorhydria, mildly raised glucose, normal functions of VIP. - increased intestinal secretion water and electrolytes -peripheral vasodilation -inhibits gastric acid secretion -potentiates acetylcholine action on salivary glands

19- A 40 year old single man returned from holiday in Europe with mild bloody diarrhoea which had lasted for two weeks. He had lost 2.5 kg in weight, had occasional lower abdominal cramping discomfort and a painful swelling of his left knee.

What is the most likely diagnosis?

- 1) amoebiasis [0]
- 2) campylobacter infection [100]
- 3) Crohn's disease [0]
- 4) gonococcal septicaemia [0]
- 5) ulcerative colitis [0]

Campylobacter infection is one of the commonest causes of inflammatory diarrhoea. Abdominal pain is often a prominent feature of the illness, frequently localising to the right iliac fossa, Diarrhoea may be mild or very severe, often with passage of blood. Symptoms may last a week or longer. Reactive arthritis and Reiter's syndrome can develop following infection with a number of enteric pathogens, including Shigella, Salmonella, Campylobacter and Yersinia. more ...
<http://www.who.int/inf-fs/en/fact255.html>

20- A 43 year old male presents with weight loss and watery diarrhoea. Investigations reveal hypokalaemia with a pancreatic mass. Which of the following would support the diagnosis of a VIPoma?

- 1) Achlorhydria [100]
- 2) Hypoglycaemia [0]
- 3) Increased Pancreatic polypeptide [0]
- 4) Migratory erythema [0]
- 5) Pellagra [0]

Achlorhydria is classically associated with VIPoma together with profuse diarrhoea, a hypokalaemic acidosis and hyperglycaemia. Migratory erythema is associated with a glucagonoma and pancreatic polypeptide is associated with its own syndrome. Pellagra is associated with the carcinoid syndrome.

21- A 68 year old male presents with alcoholic cirrhosis complicated by mild ascites. Which of the following features is likely in this patient?

- 1) Increased serum sodium [0]
- 2) Increased vascular resistance [0]
- 3) Reduced urinary potassium excretion [0]
- 4) Reduced renin concentrations [0]
- 5) Reduced urinary sodium excretion [100]

Remember they have secondary hyperaldosteronism - sodium retention with consequent potassium loss. There is decreased vascular resistance, increased plasma volume and low serum sodium.

22- A 58-year-old man complains of tiredness, fever, weight loss, arthralgia and diarrhoea. Jejunal biopsy reveals flattened mucosa containing periodic acid-Schiff (PAS) positive macrophages. What is the most likely diagnosis?

- 1) coeliac's disease [0]
- 2) tuberculosis [0]
- 3) tropical sprue [0]
- 4) parasitic infection [0]
- 5) whipple's disease [100]

Whipple's disease is rare and affects most commonly middle-aged males. It can affect any organ, but dominated by involvement of small bowel, causing malabsorption. The organism (*Tropheryma whipplei*) can be identified both between and within abnormal macrophages, which stain magenta with PAS. Treat with prolonged antibiotics eg parenteral penicillin and streptomycin for 2 weeks, followed by 1 year of doxycycline.

23- A 48-year-old woman complains of pruritis, steatorrhoea and bruising. On examination, she is jaundiced, pigmented with spider naevi and hepatosplenomegaly. What is the most likely underlying diagnosis?

- 1) autoimmune hepatitis [0]
- 2) primary biliary cirrhosis [100]
- 3) alcoholic liver disease [0]
- 4) alpha-1 antitrypsin deficiency [0]
- 5) Wilson's disease [0]

She has clinical evidence of chronic liver disease and portal hypertension. The 2 main conditions causing pigmentation and chronic liver disease are primary biliary cirrhosis (PBC) and haemochromatosis. PBC is a chronic cholestatic inflammatory liver disease, the aetiology of which is probably autoimmune. It most commonly affects

middle-aged women. There is jaundice with skin pigmentation, risk of developing oesophageal varices and fat malabsorption, leading to deficiency of the vitamins A, D, E, K (hence osteomalacia and also bruising). Serum antimitochondrial antibody is positive in 95-99% cases.

24- Which of the following concerning the conjugation of bilirubin is correct?

- 1) is catalysed by a glucuronyl transferase [100]
- 2) occurs in the Kupfer cells of the liver [0]
- 3) is increased by valproate [0]
- 4) is inhibited by rifampicin [0]
- 5) is impaired in Dubin-Johnson syndrome [0]

b - Hepatocytes. c - Enzyme inhibitor. d - Enzyme inducer. e - Conjugation is OK but excretion from the hepatocyte into the bile is impaired. (Gilbert's syndrome - bilirubin can't Go in to the hepatocyte - unconjugated bilirubinaemia. Crigler-Najjar syndrome - bilirubin can't Conjugate - unconjugated bilirubinaemia. Dubin-Johnson syndrome - bilirubin can't Depart from the hepatocyte - conjugated bilirubinaemia.)

25- A 70 year old man was admitted with pallor, light-headedness and loss of energy. On the day prior to admission he had reported loose dark stools. Examination revealed a pulse of 90 per minute and a blood pressure of 110/70 mmHg.

Investigations revealed:

Haemoglobin 7.2 g/dL (14-18)

MCV 72 fL. (78-96)

White cell count $11.3 \times 10^9/L$ (4-11)

Platelet count $480 \times 10^9/L$ (150-400)

What is the most appropriate next step in his management?

- 1) Barium meal [0]
- 2) Blood transfusion [100]
- 3) Endoscopy [0]
- 4) Parenteral iron infusion [0]
- 5) Proton pump inhibitor therapy [0]

There is only one answer here and that is blood transfusion. He has clearly had a major GI bleed since he presents with symptoms of shock with a high resting heart rate and lowish blood pressure the day after what sounds like melaena. What is more he has a significant microcytic anaemia. He should be resuscitated with blood transfusion and then send for upper GI endoscopy. A barium meal will not help a bleeding vessel. Parenteral iron is for chronic anaemia not acute bleeds and proton pump inhibitors, although widely used, have no supportive evidence and are nowhere near as important as giving blood to this man.

26- Which of the following is correct regarding infection with Salmonella typhi

- 1) children are particularly likely to become carriers [0]
- 2) most carriers are female [100]
- 3) faecal culture is almost always positive during the first week of illness [0]
- 4) relapse does not occur if antibiotics are taken for 2 weeks [0]

5) vaccinated individuals who develop the disease will have a mild illness [0]

Children are rarely chronic carriers of the organism although for some unknown reason females are more commonly long-term carriers than males (Remember Typhoid Mary). c-only 50% of cases, e-higher threshold but same disease.

27- A 28-year-old lady develops abdominal pain, jaundice and ascites worsening over a week. She drinks ten units of alcohol each week and takes the oral contraceptive pill. Which of the following findings would make a diagnosis of hepatic vein thrombosis (Budd-Chiari syndrome) MOST likely?

- 1) alanine aminotransferase of 345 U/L (5 - 35) [0]
- 2) acute liver failure [0]
- 3) ankle oedema [0]
- 4) ascites fluid protein of 38 g/L [0]
- 5) tender enlarged liver [100]

The most common causes of an acute severe liver injury in a young woman are: viruses (including: HAV, HBV), drugs (particularly paracetamol OD), Autoimmune hepatitis, and hepatic vein thrombosis (often precipitated by pregnancy or OCP use). The presence of liver failure, ankle oedema, and an exudative ascites do not help differentiate between these aetiologies. The ALT of 345 is moderately elevated and compatible with BCS. With viral or drug related hepatitis the peak ALT is usually much higher than this, the ALT may already be on the way down if she has had symptoms for a week. Tender hepatomegaly is one of the hallmarks of BCS. In acute severe viral, autoimmune or drug / toxin related liver disease the necrotic liver decreases in size.

28- A 52 year old man with a diagnosis as a child of coeliac disease had been asymptomatic despite poor dietary compliance. He presents with a one month history of intermittent, colicky, central abdominal pain and 3 kilogram weight loss and positive faecal occult bloods. What is the most appropriate investigation?

- 1) Anti-endomysial antibody. [0]
- 2) Colonoscopy. [100]
- 3) CT scan of abdomen. [0]
- 4) Distal duodenal biopsy. [0]
- 5) Small bowel enema. [0]

New-onset weight loss, with positive faecal occult bloods and central abdo pain in a 52-year-old man must be assumed to be colonic carcinoma until proven otherwise. Colonoscopy is the best way to check for this and would also demonstrate inflammatory bowel disease if present. If the colonoscopy were negative, then an OGD would be needed to check for upper GI malignancy.

29- A 44 year old male with Child's grade C cirrhosis presented with haematemesis. Which one of the following drugs, administered intravenously, would be the most appropriate, immediate, treatment?

- 1) Isosorbide dinitrate. [0]

- 2) Omeprazole. [0]
- 3) Propranolol [0]
- 4) Somatostatin [100]
- 5) Tranexamic acid. [0]

The suggestion is that this patient is at particularly high risk of oesophageal varices. Child's classification of cirrhosis is a points scale based upon ascites/bilirubin etc reflecting prognosis. Graded depending upon the points scored from A-C with C reflecting greatest risk. Somatostatin acts to reduce portal pressures and has been demonstrated to be as effective as endoscopy at controlling variceal bleeding in the acute setting. Beta-blockers can be used as oral prophylaxis for oesophageal varices. IV Omeprazole has also been shown to be effective in reducing mortality in GI haemorrhage of any cause (NEJM 2002) but somatostatin may be expected to be superior for the above patient.

30- A 24-year-old man with chronic diarrhoea and malabsorption is suspected of having coeliac disease. A jejunal biopsy is taken. Which of the following findings would be expected in coeliac disease?

- 1) Shows leaf-shaped villi [0]
- 2) Shows flattening of the crypts [0]
- 3) Appearances may resemble severe tropical sprue [100]
- 4) Shows fissures penetrating into the submucosa [0]
- 5) Characteristically shows epithelial cells distended with fat globules [0]

In coeliac disease, the villi are shortened and the crypts lengthened with increased lymphocytic infiltrate. Tropical sprue may also cause subtotal villous atrophy. Fissures are not found and epithelial cells are normal.

31- In the diarrhoea associated with cholera toxin, there is activation of which of the following enzyme systems?

- 1) Adenylate cyclase. [100]
- 2) ATP. [0]
- 3) Guanylate cyclase. [0]
- 4) Na-glucose co-transporter. [0]
- 5) Na⁺/K⁺ ATPase pump. [0]

Cholera toxin has two parts, A and B. B binds while A activates G protein, which activates adenylate cyclase. Elevated CAMP results in unrestricted chloride secretion from villous crypts.

32- A 36-year-old man presented with a three day history of bloody diarrhoea. He was apyrexial and mildly icteric. Investigations revealed:

Haemoglobin 10.5 g/dL (13.0-18.0)
 White cell count 19 x 10⁹/L (4-11)
 Platelets 70 x 10⁹/L (150-400)
 Serum urea 12.5 mmol/L (2.5-7.5)

Serum aspartate aminotransferase 90 IU/L (1-31)
Prothrombin time 12s (11.5-15.5)
Blood film fragmented red cells

What is the most likely cause of his illness?

- 1) Escherichia coli 0157 colitis [100]
- 2) Ischaemic colitis [0]
- 3) Leptospirosis [0]
- 4) Salmonella enterocolitis [0]
- 5) Ulcerative colitis [0]

The combination of bloody diarrhoea, haemolytic anaemia, thrombocytopaenia but normal clotting, and renal impairment suggests haemolytic-uraemic syndrome. This is associated with E coli 0157 toxin most commonly.

33- A 52 year old woman presented with history of worsening dysphagia over many years. Recently there had been episodes of ill-defined central chest discomfort and nocturnal cough.

What is the most likely diagnosis?

- 1) achalasia [100]
- 2) Barrett's oesophagus [0]
- 3) motor neurone disease [0]
- 4) oesophageal carcinoma [0]
- 5) pharyngeal pouch [0]

Achalasia presents most often in the 3rd – 5th decade. Symptoms usually develop years before the patient presents. Vague chest discomfort is common. 30% have a nocturnal cough due to aspiration of oesophageal contents. Barrett's oesophagus does not cause dysphagia. MND causes dysphagia due to problems with chewing and initiating a swallow and would not cause chest discomfort. Oesophageal carcinoma is very unlikely due to the duration of symptoms (years). A pharyngeal pouch usually presents in the 6th-7th decade with regurgitation and would not cause chest discomfort

34- Which of the following is true of Gilbert's syndrome?

- 1) inheritance is autosomal recessive [0]
- 2) serum conjugated bilirubin levels are elevated [0]
- 3) serum bilirubin levels are decreased by fasting [0]
- 4) serum bilirubin levels are decreased by liver enzyme inducers [100]
- 5) there is bilirubinuria [0]

Gilbert's syndrome is inherited in autosomal dominant fashion and affects 2-5% of the population. UDP glucuronyl transferase levels are reduced leading to an unconjugated hyperbilirubinaemia. Whilst serum bilirubin levels are elevated the other LFTs are normal. Jaundice deepens after a period of fasting or intercurrent illness but bilirubin levels are reduced by enzyme inducers such as phenobarbitone. As unconjugated

bilirubin is tightly bound to albumin it cannot cross the glomerulus and so is not found in the urine. This contrasts with the bilirubin-glucuronide-albumin complex formed in patients with cholestatic jaundice (and raised conjugated bilirubin levels) where 1% of the complex is dialysable and although most of the bilirubin is reabsorbed in the proximal tubule some bilirubin is detectable in the urine.

35- A 26 year old presents in the first trimester of her first pregnancy (six weeks gestation) for an ante-natal check, she feels well. Blood tests show a Bilirubin of 40 $\mu\text{mol/l}$ the other LFT's are completely normal. The most likely diagnosis is:

- 1) Gilbert's syndrome [100]
- 2) Primary biliary cirrhosis [0]
- 3) Primary sclerosing cholangitis [0]
- 4) Dubin-Johnson syndrome [0]
- 5) Cholestasis of pregnancy [0]

Gilbert's is the most common condition causing mild isolated hyperbilirubinaemia. PBC & PSC are much less common conditions and are almost always associated with a rise in the other LFT's (particularly ALP & GGT). DJS is much less common than Gilbert's. Intrahepatic cholestasis of pregnancy is relatively common but usually occurs in the second or third trimester, ALP is usually high, risk increases with multiparity.

36- Which of the following conditions may give a false/positive sweat test?

- 1) Congenital adrenal hyperplasia [0]
- 2) Hyperthyroidism [0]
- 3) Hyperparathyroidism [0]
- 4) Obesity [0]
- 5) Glucose-6-phosphatase deficiency [100]

Non-cystic fibrosis conditions associated with elevated concentrations of sweat electrolytes include:

Endocrine: Untreated adrenal insufficiency, hereditary nephrogenic diabetes insipidus, hypothyroidism, hypoparathyroidism.

Metabolic: Glucose-6-phosphatase deficiency, mucopolysaccharidoses, fucosidosis.

Other: Ectodermal dysplasia, familial cholestasis, pancreatitis, malnutrition.

37- Which of the following statements regarding jejunal biopsy is correct?

- 1) Electron microscopy is necessary to confirm the presence of villous atrophy [0]
- 2) Sub-total villous atrophy is diagnostic of gluten-sensitive enteropathy and is not found in other conditions [0]
- 3) It is contra-indicated over the age of 70 years [0]
- 4) In tropical countries apparently healthy people have a mucosal structure which would be regarded as abnormal in Europe [0]
- 5) It can be used to diagnose Whipple's disease [100]

a – the villus atrophy may be seen with a magnifying glass b – sub-total villus atrophy is seen in a number of conditions other than coeliac disease (i.e. Severe tropical sprue,

cow's milk / soya sensitivity in children, gastroenteritis, Whipple's disease, hypogammaglobulinaemia, neomycin therapy, laxative abuse, Norwalk agent) c – There is a group of patients who present with coeliac disease in older age – sometimes in their 90s. They present with iron deficiency anaemia, osteoporosis or weight loss. d – They would not be 'healthy'.

38- A 54-year-old woman presented with an eighteen month history of chest pain and dysphagia for both solids and liquids. She smokes 20 cigarettes per day and drinks 16 units of alcohol per week. Clinical examination was normal. What is the most likely diagnosis?

- 1) Achalasia. [100]
- 2) Bronchial neoplasm. [0]
- 3) Oesophageal neoplasm. [0]
- 4) Oesophageal web. [0]
- 5) Pharyngeal pouch. [0]

A longstanding history of dysphagia to both solids and liquids suggests a functional rather than mechanical cause for the dysphagia. Hence a neoplasm or other obstructive lesion is unlikely. Chest pain is not a typical feature of a pharyngeal pouch. Achalasia, in which there is failure of oesophageal peristalsis and of relaxation of the lower oesophageal sphincter, typically causes the symptoms described above.

39- A 46 year old man with a family history of haemochromatosis presented to outpatients for advice. Investigations revealed.

serum ferritin 453ug/L (15 – 300)
serum iron 29 umol/L (12 – 30)
serum iron binding capacity 46 umol/L (45 – 75)
iron saturation 63 per cent (20 – 50)

What is the most appropriate next step in management?

- 1) arrange for DNA analysis [100]
- 2) begin a venesection programme [0]
- 3) monitor his serum ferritin regularly [0]
- 4) take no action unless the iron saturation exceeds 90 per cent [0]
- 5) undertake a liver biopsy [0]

This man is likely to have hereditary haemochromatosis (HHC). Homozygous mutation (C282Y mutation) of the Human Iron gene (HFE gene) accounts for over 80% of cases of HHC. The diagnosis is made on DNA analysis. If the diagnosis is confirmed then treatment with venesection to achieve and maintain a ferritin of 50-100µg/l is indicated. A liver biopsy is not required to make the diagnosis of HHC although may be indicated for prognostic reasons if cirrhosis is suspected.

40- A 45 year old woman is diagnosed with a duodenal ulcer. Which one of the following is the most sensitive test for detecting current infection with *Helicobacter pylori*?

- 1) A gastric fundal biopsy. [0]

- 2) Culture of a gastric biopsy. [100]
- 3) The (13C) urea breath test. [0]
- 4) The presence of Helicobacter pylori serum antibodies. [0]
- 5) The urease test on gastric biopsy. [0]

The gold standard for diagnosis of H. pylori remains culture of a gastric biopsy. This needs to be transported to the lab quickly or placed in a transport culture medium at 4 deg C. The presence of IgG antibodies to H. pylori could indicate previous infection. A gastric antral biopsy can give false negative results following PPI treatment.

41- A 32 year-old woman with Crohn's Disease has a history of a right hemicolectomy for ileo-colonic disease. Since the operation she has had frequent diarrhoea but no blood in the stools.

Investigations show:

ESR 10
PLT 240
serum CRP 7 (<10)

Which is the best treatment?

- 1) Cholestyramine [100]
- 2) Mesalazine [0]
- 3) Metronidazole [0]
- 4) Omeprazole [0]
- 5) Prednisolone [0]

The ESR, CRP and platelet counts are not raised, indicating that this patient's symptoms are not due to active Crohn's.

Also the diarrhoea is not bloody which goes against active Crohn's colitis. Hence mesalazine or prednisolone would not be effective here. Metronidazole is typically given for peri-anal disease. The history includes a previous right hemicolectomy for ileo-colonic disease. Loss of the terminal ileum frequently leads to bile salt malabsorption and treatment with the bile salt chelator cholestyramine quickly relieves the problem.

42- A 24 year old woman was referred with tiredness and intermittent bloody diarrhoea and a past history of cerebral venous thrombosis. On examination, the sclera of the right eye was inflamed, and multiple mouth ulcers were noted. At the colonoscopy, which confirmed colitis, two large vulval ulcers were noted. Which is the most likely diagnosis?

- 1) Behcet's disease. [100]
 - 2) Crohn's disease. [0]
 - 3) HIV infection [0]
 - 4) Syphilis [0]
 - 5) Ulcerative colitis. [0]
-

A classical description of the presentation of Behcet's, with oral and genital ulceration, colitis and scleritis.

43- Which of the following is the commonest cause of traveller's diarrhoea?

- 1) E. Coli [100]
- 2) Entamoeba Histolytica [0]
- 3) Giardia Lamblia [0]
- 4) Shigella Flexneri [0]
- 5) Yersinia enterocolitica [0]

Enterotoxigenic E Coli is the commonest cause of travellers diarrhoea and is usually a self limiting condition. Usually no treatment nor investigation is required for this brief diarrhoeal illness. Other causes that may be associated with prolonged diarrhoea include Giardia and amoebiasis. Chronic diarrhoea merits investigation.

44- A 59 year old woman has had insulin dependent diabetes mellitus for over two decades. The degree of control of her disease is characterized by the laboratory finding of a HbA1c of 10.1%. She complains of repeated episodes of abdominal pain following meals. These episodes have become more frequent and last for longer periods over the last couple of months. On physical examination, there are no abdominal masses or organomegaly and no tenderness to palpation.

Which of the following findings is most likely to be present?

- 1) Acute pancreatitis [0]
- 2) Chronic renal failure [0]
- 3) Hepatic infarction [0]
- 4) Mesenteric artery occlusion [100]
- 5) Ruptured aortic aneurysm [0]

Diabetes- especially Type 2 diabetes- is associated with macrovascular disease. Smoking is a further risk factor for macrovascular atherosclerosis. After a meal splanchnic blood flow is increased. If the mesenteric artery is occluded the lack of blood flow to the bowel will produce ischaemic type pain. Chronic renal failure may be present but would not cause post prandial pain. Ruptured aortic aneurysm would normally present acutely with hypotension, cold lower limbs with reduced pulses and a pulsatile, tender abdominal mass. Pancreatitis is unlikely given the history and the lack of epigastric tenderness. Hepatic infarction should lead to right upper quadrant pain.

45- Which of the following is true of Spontaneous bacterial peritonitis?

- 1) A survival rate of over 50% is expected at one year [0]
 - 2) Gentamicin is the treatment of choice [0]
 - 3) is characteristically caused by aerobic bacteria. [100]
 - 4) is diagnosed by culture of ascitic fluid. [0]
 - 5) is due to intestinal perforation [0]
-

SBP is a frequent complication of the ascites of cirrhosis. It is diagnosed by ascitic fluid examination which reveals a PMN count of >250/ml. SBP has poor prognostic significance with a one year survival after a diagnosis of between 30-50%. It is, as the name suggests a spontaneous event that is not a consequence of intestinal perforation. It is speculated that the infective organism may leak into the ascitic fluid via the blood or from intestinal overgrowth. Organisms should be cultured by directly collecting into blood culture bottles. It is typically caused by aerobic Gram negative bacteria. Hence Cefotaxime is regarded as the drug of choice for treatment.

46- A 30 year old caucasian male presents with a six month history of weight loss, abdominal pain, and diarrhoea. On examination you note finger clubbing. Which of the following diagnoses is least likely.

- 1) Crohn's disease [0]
- 2) Ulcerative colitis [0]
- 3) Coeliac disease [0]
- 4) Whipple's disease [0]
- 5) Ileo-caecal TB [100]

Ileo-caecal TB is the only condition mentioned not associated with clubbing and would be very rare in a young caucasian in the UK.

47- Reflux oesophagitis of gastric contents

- 1) is a cause of asthma [0]
- 2) can be improved by Helicobacter pylori eradication [0]
- 3) Occurs during transient relaxation of the lower oesophageal sphincter [100]
- 4) Is neutralised by bicarbonate secreted by the oesophageal mucosa [0]
- 5) Can be excluded by a normal appearance at endoscopy [0]

Diagnosis is based predominantly on history, with a very proportion of patients with reflux disease having a normal endoscopy. H pylori eradication is indicated in long term healing of gastric and duodenal ulceration, but not reflux disease. Brunner's glands are found in the duodenum which secrete alkaline mucus. Intra-oesophageal PH monitoring is used to exclude reflux as cause of bronchoconstriction. Reflux oesophagitis of gastric contents is a cause of chronic cough and not asthma.

48- Which statement is true concerning iron?

- 1) Iron absorption is mainly in the distal jejunum. [0]
- 2) Parenteral iron is indicated if the haemoglobin level is not raised within 3 days by oral iron. [0]
- 3) Sustained release preparations are useful if larger doses are required. [0]
- 4) 200mg iron sulphate has more elemental iron than an equal dose of iron gluconate. [100]
- 5) Absorption is prevented by ascorbic acid. [0]

Important for the structure of haemoglobin and myoglobin for O₂ and CO₂ transport; oxidative enzymes; cytochrome C and catalase. Absorbed in ferrous form in small bowel according to body need, aided by gastric juice and ascorbic acid; hindered by

fibre, phytic acid and steatorrhoea. Transported in plasma in ferric state bound to transferrin; stored in liver, spleen, bone marrow and kidney as ferritin and haemosiderin; conserved and reused; minimal losses in urine and sweat; about 90% of intake excreted in stool. Ferrous sulphate contains about twice the amount of elemental iron as the gluconate. Levels raise Hb levels about 0.5g/100ml per week. Sustained release preparations should not be used, as they delay release beyond the early small bowel, where most iron absorption occurs.

49- Following factors decrease large intestinal motility:

- 1) Parasympathetic activity [0]
- 2) Anticholinergic agents [100]
- 3) Gastric Distension [0]
- 4) CCK-PZ [0]
- 5) Laxatives. [0]

The others and cholinergic agents increase large intestinal motility.

50- Which of the following statements is correct of hepatitis C virus infection?

- 1) Cell cultures of virus are routinely used to assess response to drug therapy [0]
- 2) High antibody titres are an indication for therapy [0]
- 3) Less than 5% of cases lead to chronic infection [0]
- 4) More likely to be transmitted by the sexual route than hepatitis B virus [0]
- 5) Treatment with ribavirin and interferon alpha is more effective than interferon alpha alone [100]

In hepatitis C infection the criteria for treatment are abnormal liver function tests and detectable hepatitis C RNA in plasma, with evidence of moderate inflammation on liver biopsy. Response to therapy is determined by normalisation of hepatic transaminases and undetectability of hepatitis C RNA in plasma. Hepatitis C is generally transmitted by inoculation or vertically from mother-to-child. In contrast to hepatitis B, sexual transmission is uncommon. Around 85% of acute hepatitis C infections lead to chronic infection. Treatment with interferon alpha alone has around a 10-15% success rate in achieving long-term undetectability of plasma hepatitis C RNA. Combination treatment with ribavirin and interferon alpha has been found to have approximately a 45% success rate.

51- Which ONE statement is true regarding the treatment of iron deficiency anaemia:

- 1) iron is absorbed in the distal jejunum [0]
- 2) absorption of iron is increased by ascorbic acid [100]
- 3) sustained release iron is a useful way of giving larger doses [0]
- 4) ferrous sulphate 200mg has less elemental iron than the same dose of ferrous gluconate [0]
- 5) parenteral iron is indicated when the anaemia responds slowly to oral iron [0]

1 - iron is absorbed in the upper small intestine. 2 - absorption of oral iron is improved by ascorbic acid. 3 - sustained release preparations may improve tolerance of oral iron but do not aid absorption. 4 - ferrous sulphate has more elemental iron by mass. 5 -

parenteral iron acts no faster than oral iron. It is indicated when oral iron cannot be tolerated or is not absorbed.

52- A 35 year old woman with alcoholic cirrhosis is admitted with deteriorating encephalopathy and abdominal discomfort. An ascitic tap revealed a polymorphonuclear cell count of 350 cells per mm³.

Which of the following is the most appropriate therapy?

- 1) Intravenous amoxicillin [0]
- 2) Intravenous cefotaxime [100]
- 3) Intravenous metronidazole [0]
- 4) Oral neomycin [0]
- 5) Oral norfloxacin [0]

This lady has Spontaneous Bacterial Peritonitis as suggested by the typical history, ascites and raised polymorphonuclear count within the ascitic tap. It is most commonly seen in alcoholic cirrhosis and the causative organism is usually E. Coli, Klebsiella, S Pneumoniae or Enterococci. (Compare this with the mixed growth seen in other forms of peritonitis). Sending some ascitic fluid in blood culture bottles increases the yield. Initial treatment is with broad spectrum antibiotics such as cefotaxime. Norfloxacin is recommended for short term prophylaxis.

SPONTANEOUS BACTERIAL PERITONITIS

most commonly seen in conjunction with alcoholic cirrhosis

uncommon < 10% of cirrhotics

almost always in association with ascites

haematogenous spread of organisms (the diseased liver letting them through)

presentation

fever 80%

ascites predates infection

abdominal pain

acute onset

peritonism

> 300 polymorphs per microlitre diagnostic

organisms (usually single growth cf. secondary peritonitis)

E. coli commonest

other gram -ves

streptococci and enterococci also seen

diagnosis

clinical suspicion

placing ascitic fluid in blood culture bottle improves yield

Hepatology

1- A 56-year-old man from Thailand presented with abdominal pain and a mass in the right upper quadrant. He reported that he had been diagnosed with viral hepatitis several years previously. Investigations showed:

Serum alpha-fetoprotein 13,500 IU/L (< 10)

What is the most likely underlying viral infection?

- 1) Hepatitis A virus [0]
- 2) Hepatitis B virus [100]
- 3) Hepatitis C virus [0]
- 4) Hepatitis D virus [0]
- 5) Hepatitis E virus [0]

Very difficult! The patient has chronic viral hepatitis and presents with a hepatoma. The underlying cause must be either HBV or HCV. There is a higher prevalence of HBV in the Far East and since his country of origin is the only other detail that gives a clue to the cause of his hepatitis, the most likely viral agent is HBV.

2- A 58-year-old man has had an enlarging abdomen for several months. He has experienced no abdominal or chest pain. On physical examination he has a non-tender abdomen with no masses palpable, but there is a fluid thrill. An abdominal Ultrasound Scan shows a large abdominal fluid collection with a small cirrhotic liver. A chest X-ray shows a globally enlarged heart. Which of the following conditions is most likely to be present?

- 1) Dilated cardiomyopathy [100]
- 2) Lymphocytic myocarditis [0]
- 3) Myocardial amyloid deposition [0]
- 4) Nonbacterial thrombotic endocarditis [0]
- 5) Severe occlusive coronary atherosclerosis [0]

This man has alcoholic liver cirrhosis with ascites. The cardiomyopathy of alcoholism is a dilated or congestive form.

3- Which of the following is true of Spontaneous bacterial peritonitis?

- 1) A survival rate of over 50% is expected at one year [0]
- 2) Gentamicin is the treatment of choice [0]
- 3) is characteristically caused by aerobic bacteria. [100]
- 4) is diagnosed by culture of ascitic fluid. [0]
- 5) is due to intestinal perforation [0]

SBP is a frequent complication of the ascites of cirrhosis. It is diagnosed by ascitic fluid examination which reveals a PMN count of >250/ml. SBP has poor prognostic significance with a one year survival after a diagnosis of between 30-50%. It is, as the name suggests a spontaneous event that is not a consequence of intestinal perforation. It is speculated that the infective organism may leak into the ascitic fluid via the blood or from intestinal overgrowth. Organisms should be cultured by directly collecting into blood culture bottles. It is typically caused by aerobic Gram negative bacteria. Hence Cefotaxime is regarded as the drug of choice for treatment.

4- A 68 year old male presents with alcoholic cirrhosis complicated by mild ascites. Which of the following features is likely in this patient?

- 1) Increased serum sodium [0]
- 2) Increased vascular resistance [0]
- 3) Reduced urinary potassium excretion [0]
- 4) Reduced renin concentrations [0]
- 5) Reduced urinary sodium excretion [100]

Remember they have secondary hyperaldosteronism - sodium retention with consequent potassium loss. There is decreased vascular resistance, increased plasma volume and low serum sodium.

5- A 28-year-old lady develops abdominal pain, jaundice and ascites worsening over a week. She drinks ten units of alcohol each week and takes the oral contraceptive pill. Which of the following findings would make a diagnosis of hepatic vein thrombosis (Budd-Chiari syndrome) MOST likely?

- 1) alanine aminotransferase of 345 U/L (5 - 35) [0]
- 2) acute liver failure [0]
- 3) ankle oedema [0]
- 4) ascites fluid protein of 38 g/L [0]
- 5) tender enlarged liver [100]

The most common causes of an acute severe liver injury in a young woman are: viruses (including: HAV, HBV), drugs (particularly paracetamol OD), Autoimmune hepatitis, and hepatic vein thrombosis (often precipitated by pregnancy or OCP use). The presence of liver failure, ankle oedema, and an exudative ascites do not help differentiate between these aetiologies. The ALT of 345 is moderately elevated and compatible with BCS. With viral or drug related hepatitis the peak ALT is usually much higher than this, the ALT may already be on the way down if she has had symptoms for a week. Tender hepatomegaly is one of the hallmarks of BCS. In acute severe viral, autoimmune or drug / toxin related liver disease the necrotic liver decreases in size.

6- A 45 year old man was receiving phenytoin for long-standing epilepsy. He admitted to heavy alcohol consumption. Examination revealed no focal or neurological signs, 3cm hepatomegaly but no splenomegaly. Investigations showed:

Haemoglobin 10.0 g/dL (13-18), MCV 122 fL (80-96), White cell count $2.2 \times 10^9/L$ ($4-11$), Platelet count $90 \times 10^9/L$ (150-400).

What is the most likely explanation for these results?

- 1) Alcoholic liver disease. [100]
- 2) Aplastic anaemia. [0]
- 3) Folate deficiency. [0]
- 4) Hypothyroidism. [0]
- 5) Scurvy. [0]

The salient features are no abnormal neurology (which would argue against hypothyroidism (slow relaxation of reflexes), a mild pancytopenia with increased

MCV and hepatomegaly. The most likely cause for these features is chronic alcohol abuse. Folate deficiency could contribute to the macrocytic anaemia but would not be associated with the hepatomegaly nor leucopaenia/thrombocytopaenia. Scurvy/vitamin C deficiency is associated with bleeding gums, corkscrew hairs, petechiae and a neuropathy. A far more profound pancytopenia would be expected with marrow aplasia.

7- Which of the following is true concerning a hepatitis E infection?

- 1) It can be transmitted with hepatitis B. [0]
- 2) It is a recognised cause of chronic liver disease. [0]
- 3) CT scan of the liver with contrast shows diagnostic appearances. [0]
- 4) The incidence of chronic liver disease is reduced by administration of alpha interferon. [0]
- 5) It does not result in a carrier state. [100]

Five hepatitis viruses form a heterogeneous group causing similar clinical illnesses. Hepatitis A, C, D, and E are all RNA viruses coming from 4 different families; and hepatitis B is a DNA virus. Hepatitis A & E cause acute illness, with the former causing most hepatitis in childhood and hepatitis E being very rare. Hepatitis B, C, and D cause chronic morbidity and mortality, with B causing a third of cases, hepatitis C a fifth of cases, and D being very rare. Hepatitis D illness cannot occur without B as a helper virus. Hepatitis B can be treated with interferon-alpha, which improves liver disease. Copyright © 2002 Dr Colin Melville

8- Which of the following statements is correct of hepatitis C virus infection?

- 1) Cell cultures of virus are routinely used to assess response to drug therapy [0]
- 2) High antibody titres are an indication for therapy [0]
- 3) Less than 5% of cases lead to chronic infection [0]
- 4) More likely to be transmitted by the sexual route than hepatitis B virus [0]
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In hepatitis C infection the criteria for treatment are abnormal liver function tests and detectable hepatitis C RNA in plasma, with evidence of moderate inflammation on liver biopsy. Response to therapy is determined by normalisation of hepatic transaminases and undetectability of hepatitis C RNA in plasma. Hepatitis C is generally transmitted by inoculation or vertically from mother-to-child. In contrast to hepatitis B, sexual transmission is uncommon. Around 85% of acute hepatitis C infections lead to chronic infection. Treatment with interferon alpha alone has around a 10-15% success rate in achieving long-term undetectability of plasma hepatitis C RNA. Combination treatment with ribavirin and interferon alpha has been found to have approximately a 45% success rate.

9- A 60-year-old woman with known alcoholic liver cirrhosis presents with vague abdominal pains, malaise and nausea. She has been abstinent since she was diagnosed eight months ago. On examination she had moderate ascites and mild, generalised abdominal tenderness.

Investigations

Haemoglobin 11.2 g/dL (11.5 - 16.5)
WCC $15 \times 10^9/L$ (4 - 11)
prothrombin time 21 s (<15s)
serum albumin 28 g/L (37 - 49)
serum total bilirubin 56 micromol/L (1 - 22)
ascitic fluid protein 26 g/L
ascitic fluid amylase normal
ascitic fluid white cell count $500 \times 10^9/L$

What is the most likely reason for her current problem?

- 1) hepatic vein thrombosis [0]
- 2) pancreatic pseudocyst rupture [0]
- 3) portal vein thrombosis [0]
- 4) primary liver cancer [0]
- 5) spontaneous bacterial peritonitis [100]

The high white cell count in the ascites makes spontaneous bacterial peritonitis (SBP) much more likely than Budd Chiari Syndrome (BCS), PVT, HCC, or a ruptured pancreatic pseudocyst. Abdominal pain is often only mild, or even absent in SBP, with patients often presenting with otherwise unexplained hepatic decompensation.

10- A 68-year-old man has been very ill for months following the onset of chronic liver disease with hepatitis C infection. He experiences a sudden loss of consciousness and then exhibits paraplegia on the right. A cerebral angiogram reveals lack of perfusion in the left middle cerebral artery distribution. The most likely cardiac lesion to be associated with this finding is?

- 1) Acute rheumatic fever [0]
- 2) Left atrial myxoma [0]
- 3) Libman-Sacks endocarditis [0]
- 4) Non-bacterial thrombotic endocarditis [100]
- 5) Paradoxical thromboembolus [0]

Marantic endocarditis has platelet-fibrin thrombi that are prone to embolize. This form of non-infective endocarditis can be seen in persons who are very debilitated or who have a hypercoagulable state.

11- Which of the following concerning the conjugation of bilirubin is correct?

- 1) is catalysed by a glucuronyl transferase [100]
- 2) occurs in the Kupfer cells of the liver [0]
- 3) is increased by valproate [0]
- 4) is inhibited by rifampicin [0]
- 5) is impaired in Dubin-Johnson syndrome [0]

b - Hepatocytes. c - Enzyme inhibitor. d - Enzyme inducer. e - Conjugation is OK but excretion from the hepatocyte into the bile is impaired. (Gilbert's syndrome - bilirubin

can't Go in to the hepatocyte - unconjugated bilirubinaemia. Crigler-Najjar syndrome - bilirubin can't Conjugate - unconjugated bilirubinaemia. Dubin-Johnson syndrome - bilirubin can't Depart from the hepatocyte - conjugated bilirubinaemia.)

Genitourinary

1- Which of the following is a recognised cause of acute renal failure?

- 1) Burns [100]
- 2) Dermatomyocytis [0]
- 3) Duchenne muscular dystrophy [0]
- 4) Penicillin therapy [0]
- 5) Alport's Syndrome [0]

Causes of acute renal failure can be divided into pre-renal, renal and post-renal.

Pre-renal:

Hypovolaemia (gastroenteritis, burns, sepsis, haemorrhage, Nephrotic Syndrome).

Circulatory failure.

Renal:

Vascular: HUS, vasculitis, embolus, renal vein thrombosis.

Tubular: acute tubular necrosis, ischaemic, toxic, obstructive.

Glomerular: glomerulonephritis.

Interstitial: interstitial nephritis, pyelonephritis.

Acute chronic renal failure.

Post-renal:

obstruction, either congenital or acquired. Although Alport's Syndrome is associated with end stage renal failure, this usually progresses gradually so that it occurs in adult life.

2- Which of the following is characteristic of Bartter's Syndrome?

- 1) Secondary hyperaldosteronism [100]
- 2) Hyperkalaemia [0]
- 3) Metabolic acidosis [0]
- 4) Reduced renal concentrating ability [0]
- 5) Diarrhoea [0]

Bartter's Syndrome is a rare form of renal potassium wasting characterised by hypokalaemia, normotension, and elevated renin and aldosterone levels. It is occasionally autosomal recessive. There is hyperplasia of the juxtaglomerular apparatus in most cases. It is postulated that the primary defect is in chloride reabsorption in the ascending limb, resulting in sodium chloride excessively presented to the distal tubule, with sodium reabsorption in exchange for potassium, resulting in urinary sodium wasting. There is secondary stimulation of prostaglandin synthesis, which activates the renin angiotensin aldosterone system which exacerbates the renal potassium wasting. Growth failure, muscle weakness, constipation, polyuria and dehydration are typical in younger children with muscle weakness, cramps or carpopedal spasms present in older children. The potassium is $<2.5\text{mmol/L}$, there is metabolic alkalosis, and hyperammonaemia with hyperaldosteronism. There are high

levels of urinary potassium and chloride. The high urinary chloride level is helpful in distinguishing it from similar presentations which have low urinary chloride levels, such as liquorice, laxative, or diuretic use, persistent vomiting or diarrhoea, pyelonephritis, or diabetes insipidus. Oral potassium and indomethacin may be used.

Haematology

1- A 75 year old man has a history of Chronic Lymphocytic Leukaemia. He has had treatment with several courses of chemotherapy and has now been admitted to hospital with pneumonia. His past medical history revealed that he had suffered several previous upper respiratory tract infections over the previous six months.

Which of the following components of his immune system is likely to be deficient?

- 1) Complement [0]
- 2) Immunoglobulin G [100]
- 3) Macrophages [0]
- 4) Mast cells [0]
- 5) T lymphocytes [0]

CLL is commonly complicated by panhypogammaglobulinaemia. Although IV immunoglobulin prevents recurrent infections it does not prolong survival.

2- In porphyria, which of the following is least likely to precipitate an acute attack:

- 1) Menstruation [0]
- 2) Aspirin [100]
- 3) Phenytoin [0]
- 4) Thiopentone [0]
- 5) Starvation [0]

Porphyria is a group of diseases characterised by excess production and excretion of porphyrins and their precursors. They are caused by enzyme defects within the haem metabolic pathway. Stress, infection, pregnancy, menstruation, starvation and certain drugs may precipitate acute attacks. Definite precipitants include sulphonamides, barbiturates and phenytoin.

Drugs unsafe in porphyria - BNF

<http://bnf.vhn.net/bnf/documents/bnf.1937.html>

3- Which of the following public health measures would reduce the incidence of iron deficiency anaemia?

- 1) Using doorstep cow's milk from 6 months of age. [0]
- 2) Giving young children tea rather than fruit juice. [0]
- 3) Delaying the introduction of mixed feeding until 9 months of age. [0]
- 4) Giving 0.5mg per day of elemental iron to all preterm babies. [0]
- 5) Continuing breast feeding until a year of age. [100]

The following would achieve primary prevention of iron deficiency anaemia:

Provision of adequate iron supplements for premature and low birth weight infants in adequate dosage (2mg/kg of elemental iron per day).

Not using unmodified doorstep milk in the first year of life. Although breast milk has a low iron concentration, the relative bioavailability is much higher than from modified or unmodified cow's milk.

Not giving young children tea (this reduced iron's bioavailability).

Use of follow-on or ordinary infant formulae in the second half of the first year of life.

Weaning on to mixed feeding by 6 months of age.

Iron supplementation for all children in high risk groups.

4- Which is true regarding iron deficiency anaemia?

- 1) The commonest cause in adolescents is chronic blood loss. [0]
- 2) It does not affect school progress. [0]
- 3) It commonly co-exists with thalassaemia. [0]
- 4) Cow's milk is a major source of iron for children. [0]
- 5) Lead poisoning is commonly associated with iron deficiency. [100]

Iron is absorbed in the proximal small intestine, mediated partly by the duodenal protein mobilferrin. About 10% of dietary iron is absorbed, and iron is absorbed 2-3 times more efficiently from human milk than from modified cow's milk. During the first years of life, because relatively small quantities of iron-rich foods are taken, it is often difficult to attain sufficiency iron. The diet should include foods such as infant cereals or formulae that have been fortified with iron. Breast fed infants should receive iron supplements from 4 months of age. At best, the infant is in a precarious situation with respect to iron. Should the diet become inadequate, or external blood loss occur, anaemia ensues rapidly. In children with microcytic anaemia who fail to respond to iron, thalassaemia should be considered.

In this country there is an increased incidence in those from

5- Which of the following associations is correct?

- 1) Renal transplantation and Non-Hodgkin's lymphoma [0]
- 2) Hepatitis B and aplastic anaemia [100]
- 3) Turner's syndrome and acute myeloid leukaemia [0]
- 4) Basophilia and chronic myeloid leukaemia [0]
- 5) Crohn's disease and TB [0]

Post-renal transplant complications include:

Renal: acute tubular necrosis, acute and chronic rejection, technical urological or urovascular problems, recurrence of the original renal disease, urinoma.

Drug toxicity (immunosuppressives, antibiotics).

Infection (particularly viral e.g. CMV, systemic), wound or urinary tract infection.

Bleeding.

Pancreatitis, lymphocele, bowel obstruction. Aplastic anaemia may be acquired or congenital.

Congenital causes:

Fanconi anaemia, reticular dysgenesis, Schwachman-Diamond Syndrome, dyskeratosis congenita, familial aplastic anaemia, preleukaemias, myodysplasia, monosomy 7, non-haematological syndromes (Down's, Seckle, Dubowitz).

Acquired causes:

Idiopathic

Secondary:

Radiation, drugs and chemicals (either predictable or idiosyncratic).

Viruses: EBV, hepatitis, parvovirus, HIV.

Immunological diseases: eosinophilic fascitis, hypogammaglobulinaemia, thymoma.

Other: pregnancy, paroxysmal nocturnal haemoglobinuria, preleukaemia.

AML constitutes 20% of all childhood leukaemias, but is the predominant in the neonatal period. It has an increased incidence in Down's Syndrome, Fanconi anaemia, Diamond-Blackfan anaemia, Kostmann Syndrome and Bloom Syndrome. It also occurs in children treated for a previous leukaemia, with a peak incidence within 10 years of the initial malignancy. This may be related to alkylating agents, agents that inhibit DNA repair, or radiation therapy. CML is a clonal malignancy of the haematopoietic stem cell characterised by a specific location, the t(9;22) (q34;q1), known as the Philadelphia chromosome. This juxtaposition produces a fusion gene. CML is rare in children, accounting for only 3% of childhood leukaemia. In most cases there is no predisposing feature. The films shows elevated white cell counts (which may exceed 105 per mm³, with all forms of myeloid cells seen in the blood smear. Platelet count may be elevated, and the bone marrow is hypercellular.

Cytogenetic and molecular studies demonstrating the Philadelphia chromosome confirm the diagnosis. Currently, there is no evidence to link Crohn's disease with TB.

6- Folic acid metabolism can be affected by

- 1) tetracycline [0]
- 2) pyrimethamine [100]
- 3) vitamin B12 [0]
- 4) penicillin [0]
- 5) brufen [0]

Drugs which inhibit dihydrofolate reductase = methotrexate, pyrimethamine and trimethoprim. Drugs which interfere with absorption/storage of folate = phenytoin, primidone, oral contraceptives.

7- Which of the following statements is true of sickle cell disease?

- 1) a painful shoulder joint will respond to intra-articular corticosteroid injection [0]
- 2) oral iron supplements are required [0]
- 3) symptoms of anaemia are usually limiting when Hb equals 8 g/dl [0]
- 4) there is often an inability to concentrate urine [100]
- 5) the spleen is frequently enlarged [0]

There is a tendency to iron overload in sickle cell disease and therefore iron therapy is not usually indicated.

The spleen is decreased in size after 6 months of age.

Blood transfusion is not indicated since anaemia is usually only symptomatic below 7g/dl - oxygen is released more readily from erythrocytes.

Intra-articular steroids should be avoided. Bone disease in sickle cell disease consists of aseptic necrosis, acute infarction and osteomyelitis so steroids will be harmful.

8- Which of the following auto-antibodies may have a role in monitoring disease activity.

- 1) Rheumatoid factor in rheumatoid arthritis [0]
- 2) Antinuclear antibodies in systemic lupus erythematosus [0]
- 3) Anti-Sm antibodies in systemic lupus erythematosus [0]
- 4) Anti-ds DNA antibodies in systemic lupus erythematosus [100]
- 5) Anti-Ro (SSA) antibodies in Sjogren's syndrome [0]

The serum levels of anti-dsDNA antibodies appears to correlate with disease activity in many patients and often levels will rise just before a flare of disease. The relationship is not close enough to be able to alter treatment based on a rising titre of antibodies but patients should be followed more closely in this situation. Anti-Sm antibodies are very specific for SLE but not sensitive and there is no evidence that levels change with disease activity. The only other autoantibody where there may be some correlation between levels and disease activity is cANCA in Wegener's granulomatosis.

9- A 60-year-old Chinese man has been started on quinine for leg cramps by his General Practitioner. He presents, a week later, with 5 days of darkened urine and 2 days of increasing breathlessness, back pain and fatigue. Investigations show a haemoglobin of 7.0 g/dl and raised reticulocyte count. Which of the following best explain this drug reaction?

- 1) autoimmune haemolytic anaemia [0]
- 2) glucose-6-phosphate dehydrogenase deficiency [100]
- 3) hereditary spherocytosis [0]
- 4) pyruvate kinase deficiency [0]
- 5) sickle cell disease [0]

G6PDH (X-linked recessive) is seen in African, Mediterranean, Iraqi Jew, South East Asian and Chinese people and predisposes to a haemolytic anaemia reaction with drugs or infection. Implicated drugs include - aspirin, sulphonamides, antimalarials, and quinidine. The haemolytic anaemia is non-immune (DAT -ve). Pyruvate Kinase Deficiency is autosomal recessive and presents as a chronic haemolytic anaemia exacerbated by viral infections. Hereditary spherocytosis is characterised by variable chronic non-immune haemolysis exacerbated by infections.

10- A 23 year old male presents with a deep vein thrombosis. He has no past medical history but his mother has suffered from deep vein thromboses. Which of the following is likely to be found on haematological assessment?

- 1) Factor V Leiden mutation [0]
- 2) Protein S deficiency [0]
- 3) Protein C deficiency [0]

- 4) Antithrombin deficiency [100]
- 5) Lupus anticoagulant [0]

Antithrombin deficiency is an autosomal dominant condition present in 0.02 - 1.1% of the population and is found in 4% of subjects that present with a thromboembolism. Factor V Leiden is a possibility although seems less likely as the inheritance pattern seems more likely to be AD. Similarly as the son had a DVT this would be far less likely with FVLeiden than ATIII as thrombosis is more often precipitated in females on the OCP. See (Simioni P, Sanson BJ, Prandoni P, et al. *Thromb Haemost* 1999 Feb;81(2):198-202) who show that "The annual incidences of total and spontaneous venous thromboembolic events in carriers of AT, PC or PS defects (n=181) were 1.01% and 0.40%, respectively, as compared to 0.10% and 0.04% in non-carriers, respectively (relative risks both 10.6). In carriers of Factor V Leiden (n= 224), the annual incidences of total and spontaneous venous thromboembolism were 0.28% and 0.11%, respectively, as compared to 0.09% and 0.04% in non-carriers, respectively (relative risks 2.8 and 2.5)."

- 11- Heinz bodies in red blood cells in haemolytic anaemia is present in
 - 1) paroxysmal nocturnal haemoglobinuria [0]
 - 2) Glucose 6 phosphate dehydrogenase deficiency [100]
 - 3) post splenectomy [0]
 - 4) cold agglutinin disease [0]
 - 5) clostridium welchii septicaemia [0]

Heinz bodies = oxidised denatured Hb. Post splenectomy causes target cells, Pappenheimer bodies (siderotic granules) and Howell-Jolly bodies (DNA remnants).

12- In sickle cell disease:

- 1) The Sickledex test involves adding a reagent to blood, which allows the nature of the haemoglobinopathy to be determined [0]
- 2) It is caused by the substitution of glutamic acid by valine at position 4 on the beta chain of haemoglobin [0]
- 3) The erythrocytes of Haemoglobin AS patients can sickle at a PO₂ of 5 to 6 kPa (40 ? 50 mmHg) [0]
- 4) The erythrocytes of Haemoglobin SC patients may sickle at a PO₂ of 4 kPa (30 mmHg) [100]
- 5) Exchange transfusions prior to major surgery on HbSS patients, aims to lower the HbS concentration to 60% [0]

Sickle cell disease is a haemoglobinopathy caused by the substitution of glutamic acid by valine at position 6 (from the N-terminal) of the beta chain. Inherited as an autosomal gene, heterozygous (HbAS) and homozygous (HbSS) forms exist. A low partial pressure of oxygen (PO₂) causes HbS to polymerise and precipitate, resulting in sickling of the erythrocyte. HbSS patients sickle at PO₂ of 5 ? 6 kPa and HbAS patients sickle at PO₂ of 2.5 ? 4 kPa. A mild disease is produced when heterozygotes for HbS combine with other haemoglobins e.g. Haemoglobin C, thus creating HbSC. Sickling occurs at around 4 kPa. Diagnosis of sickle cell disease requires the detection

of HbS. The Sickledex test involves the addition of reagent to blood; turbidity confirming the presence of HbS, but it gives no information on other haemoglobins. Haemoglobin electrophoresis is the only investigation that determines the nature of the haemoglobinopathy.

13- A previously fit 30 year old male presents with a two months history of weight loss, tiredness and nausea. Investigations show:

Haemoglobin 10.5 g/dL (13.0 – 18.0)
MCV 88 fL (80 – 96)
white cell count 6.0 X 10⁹/L (4 – 11)
platelet count 450 X 10⁹/L (150 – 400)
serum sodium 130 mmol/L (137 – 144)
serum potassium 5.7 mmol/L (3.5 – 4.9)
serum urea 3.0 mmol/L (2.5 – 7.5)
serum creatinine 78 µmol/L (60 – 110)
serum Total T4 55 nmol/L (50 – 150)
serum TSH 8 mU/L (0.2 – 5.5)

Which of the following is the most useful diagnostic investigation?

- 1) anti-thyroid peroxidase antibody titre [0]
- 2) insulin tolerance test [0]
- 3) free thyroxine concentration [0]
- 4) short synacthen test [100]
- 5) TRH test [0]

This patient presents with weight loss, tiredness and nausea. He has hyponatraemia, hyperkalaemia and what appears to be a mild primary hypothyroidism. The diagnosis is likely to be Addison's (primary hypoadrenalism) disease and the most appropriate test would be a short synacthen test. An insulin tolerance test is contra-indicated in patient's in whom cortisol is less than 100 nmol/l. A TRH test is rarely performed these days and really is an irrelevance.

14- A 30 year old woman presented with a deep vein thrombosis. Her previous history included investigation for infertility. Investigations revealed: Haemoglobin 12.8 g/dl (12.5-16.5) White cell count 3.6 x 10⁹/L (4-11) Platelet count 35 x 10⁹/L (150-400) Select one of the following investigations that is most likely to be abnormal?

- 1) Antiphospholipid antibodies. [100]
- 2) Homocystine concentration [0]
- 3) Platelet function test [0]
- 4) Protein C concentration. [0]
- 5) Indium-labelled white cell scan. [0]

The suggestion is that this patient has a thrombophilia, with a low platelet and white cell count. Together with the infertility a diagnosis of antiphospholipid syndrome is suggested. Although protein C deficiency is associated with thrombophilia, infertility is not a feature nor is thrombocytopenia/leucopenia. Hyperhomocystinaemia is associated with arterial thrombosis.

15- An 85 year old patient from an elderly care home, experiences sudden onset of dyspnea and palpitations. A pulmonary ventilation-perfusion scan is performed and indicates a high probability for a perfusion defect involving a pulmonary arterial branch. Which of the following findings or conditions is the one that is the most important factor favouring development of her complaint?

- 1) neutrophilia [0]
- 2) Cirrhosis of the liver [0]
- 3) Poor nutrition [0]
- 4) An increased platelet count [100]
- 5) Generalized atherosclerosis [0]

This would lead to a prothrombotic state, increasing the risk of pulmonary embolism. Cirrhosis, and possibly poor nutrition, would lead to decreased production of coagulation factors thus prolonging the INR. A neutrophilia would suggest infection leading to ventilation defect, and not a perfusion defect. Atherosclerosis would predispose to arterial thrombo-embolus.

16- A 45 year old man was receiving phenytoin for long-standing epilepsy. He admitted to heavy alcohol consumption. Examination revealed no focal or neurological signs, 3cm hepatomegaly but no splenomegaly. Investigations showed:

Haemoglobin 10.0 g/dL (13-18), MCV 122 fL (80-96), White cell count $2.2 \times 10^9/L$ (4-11), Platelet count $90 \times 10^9/L$ (150-400).

What is the most likely explanation for these results?

- 1) Alcoholic liver disease. [100]
- 2) Aplastic anaemia. [0]
- 3) Folate deficiency. [0]
- 4) Hypothyroidism. [0]
- 5) Scurvy. [0]

The salient features are no abnormal neurology (which would argue against hypothyroidism (slow relaxation of reflexes), a mild pancytopenia with increased MCV and hepatomegaly. The most likely cause for these features is chronic alcohol abuse. Folate deficiency could contribute to the macrocytic anaemia but would not be associated with the hepatomegaly nor leucopenia/thrombocytopenia. Scurvy/vitamin C deficiency is associated with bleeding gums, corkscrew hairs, petechiae and a neuropathy. A far more profound pancytopenia would be expected with marrow aplasia.

17- A 68 year old woman was admitted to hospital with evidence of biventricular cardiac failure. On examination her pulse was 100 beats per minute (sinus rhythm), and her blood pressure was 140/60 mmHg. She had haemorrhages in both fundi. Her condition improved after intravenous diuretics. Investigations revealed:

haemoglobin 5.6 g/dl (11.5 – 16.5)
haematocrit 0.19 (0.36 – 0.47)

MCV 118 fl (80 – 96)
MCH 33.0 pg (28 – 32)
WCC $3.4 \times 10^9/L$ (4 – 11)
platelet count $95 \times 10^9/L$ (150 – 400)

What is the next most appropriate step in management?

- 1) blood transfusion [0]
- 2) bone marrow aspiration [100]
- 3) intramuscular vitamin B12 alone [0]
- 4) intramuscular vitamin B12 and oral folic acid together [0]
- 5) oral folic acid alone [0]

The clinical picture represents severe megaloblastic anaemia with cardiac failure. The investigations do not mention anything about B12 or Folate assays. So the next step would be to take blood for these assays and a bone marrow aspiration to identify the cause for the anaemia and then to start large doses of intramuscular vitamin B12 and oral folic acid. (ref: OTM)

Giving oral folic acid without Vitamin B12 would be hazardous and could precipitate subacute combined degeneration of the spinal cord. Transfusion may also be hazardous in a patient with severe CCF

18- A 41-year-old African man has a history of multiple episodes of sudden onset of severe abdominal pain and back pain lasting for hours. Each time this happens, his peripheral blood smear demonstrates numerous sickled erythrocytes.

A haemoglobin electrophoresis shows 94% Hgb S, 5% Hgb F, and 1% Hgb A2. He now has increasing pain in his right groin radiating to the anterior aspect of the thigh and to the knee. His temperature was 38°C and examination of his hip revealed pain on internal rotation. A radiograph reveals irregular bony destruction of the femoral head.

The most likely organism to be responsible for these findings is?

- 1) *Candida albicans* [0]
- 2) *Clostridium perfringens* [0]
- 3) Group B streptococcus [0]
- 4) *Salmonella* species [100]
- 5) *Yersinia pestis* [0]

Salmonella osteomyelitis is seen in patients with sickle cell anemia. Other organisms that are frequent causes for osteomyelitis with sickle cell anemia include *Staphylococcus aureus* and gram negatives such as *Klebsiella*.

19- Which of the following haematological disorders is inherited as an autosomal recessive condition?

- 1) Antithrombin III deficiency [0]
- 2) Protein C deficiency [0]
- 3) Glucose-6-phosphate dehydrogenase deficiency [0]

- 4) Pyruvate kinase deficiency [100]
- 5) Acute intermittent porphyria [0]

Anti-thrombin 3 (AT3) is a plasma inhibitor protein that blocks the enzymatic activity of some serine proteases coagulation factors. The activity of this inhibitor is increased by heparin. AT3 is synthesised by the liver, is not Vitamin K dependent, and can be consumed during DIC. Normal newborns have a reduced activity. Congenital AT3 deficiency is an autosomal dominant. Treatment of thrombotic events in these patients may be difficult.

Protein C is an inhibitor that once activated inhibits clot formation and enhances fibrinolysis. It is liver synthesised and Vitamin K dependent. Protein C is converted to an active enzyme by a thrombin-thrombomodulin complex on the endothelial cell surface. Activated protein C inhibits a plasminogen activator inhibitor, which results in enhanced fibrinolysis, and, with protein S as a co-factor, inhibits the clotting of the activated factors 5 and 8 by limited proteolysis. Activated protein C thus controls the conversion of factor 10 to 10a and prothrombin to thrombin. Congenital deficiency is an autosomal dominant trait. Acquired deficiency may occur in association with infection.

Glucose-6-phosphate dehydrogenase deficiency is the most important disease of the pentose phosphate pathway, and is responsible for 2 clinical syndromes: an episodic haemolytic anaemia induced by infections or certain drugs, and a spontaneous chronic non-spherocytic haemolytic anaemia. The deficiency is X-linked, and heterozygous females are resistant to falciparum infections. There are a large number of abnormal alleles causing disease of vastly different severity.

Pyruvate kinase deficiency is a rare congenital haemolytic anaemia inherited as an autosomal recessive. Generation of ATP within the red cell is impaired resulting in an abnormally high concentration of 2,3-DPG in the red cell, which inhibits the enzymes of the pentose phosphate pathway. Clinical manifestations vary from severe neonatal haemolysis, to a mild well compensated haemolysis first noted in adulthood.

Acute intermittent porphyria is an autosomal dominant disorder resulting from partial porphobilinogen deaminase deficiency in the cytosol of all tissues including erythrocytes. Clinical expression of the disease is linked to environmental or acquired factors such as nutritional status, drugs, steroid or chemicals. The major abnormality is of the peripheral, autonomic or CNS. Major symptoms are abdominal pain, nausea, vomiting, constipation or diarrhoea. In severe cases the urine develops a port wine colour due to the high content of porphobilin, an auto-oxidation product of PBG. Hypertension and neuropathy are common, with muscle weakness, cranial nerve abnormality and seizures.

20 -Which of the following is an oncogene?

- 1) The N-Myc gene [100]
- 2) The WT1 (first Wilm's tumour) gene [0]
- 3) The Retinoblastoma gene [0]
- 4) The WT2 (second Wilm's tumour) gene [0]
- 5) The BCRabI translocation (Philadelphia chromosome) [0]

Oncogenes are endogenous human DNA sequences that arise from normal genes called proto-oncogenes. Proto-oncogenes are normally expressed in many cells, particularly during fetal development, and are thought to play an important regulatory role in cell growth and development. Alterations in the proto-oncogene can activate an oncogene, which produces unregulated gene activity, contributing directly to tumourogenesis. Oncogene alterations are important causes of:

Rhabdomyosarcomas (ras oncogene).

Burkitt's lymphoma (C-myc is translocated intact from its normal position on chromosome 8 to chromosome 14).

Neuroblastoma (N-myc proto-oncogene is seen in a proportion of patients with poor prognosis).

They should be contrasted with tumour suppressor genes. In this situation, the genes normally down regulate cell growth, and require inactivation to allow malignant growth. Examples include retinoblastoma.

21- A 44-year-old woman with type 1 diabetes mellitus has not attended the diabetic clinic for 5 years. Her HbA1c is 10.1%. Examination shows no abnormalities. Her hemoglobin level is 9 g/dL, hematocrit is 28%, and mean corpuscular volume is 94 mcm³. A blood smear shows normochromic, normocytic anaemia. Which of the following is the most likely cause?

- 1) acute blood loss [0]
- 2) chronic lymphocytic leukaemia [0]
- 3) erythropoietin deficiency [100]
- 4) microangiopathic haemolysis [0]
- 5) sideroblastic anaemia [0]

The most likely cause is progressive renal failure which leads to reduced release of erythropoietin from the kidneys. Sideroblastic anaemia (myelodysplasia) is seen in older age groups. CLL or microangiopathic haemolysis are possible causes but unlikely.

22- An 80-year-old woman has a three month history of progressive numbness and unsteadiness of her gait. On examination, there is a mild spastic paraparesis, with brisk knee reflexes, ankle reflexes are present with reinforcement, extensor plantars, sensory loss in the legs with a sensory level at T10, impaired joint position sense in the toes, and loss of vibration sense below the iliac crests.

Investigations were as follows:-

haemoglobin 12.0 g/dl

MCV 99 fl

What is the most likely diagnosis?

- 1) anterior spinal artery occlusion [0]
- 2) dorsal meningioma [100]
- 3) multiple sclerosis [0]
- 4) subacute combined degeneration of the cord [0]
- 5) tabes dorsalis [0]

The presence of a sensory loss at T10 indicates a thoracic myelopathy. Subacute combined degeneration of the cord is unlikely as Hb and MCV are normal. Anterior spinal artery occlusion is unlikely as the history is progressive.

23- A 68 year old man complained of tiredness and lethargy. On examination there was 2 cm hepatomegaly and 7 cm splenomegaly.

Investigations show

Haemoglobin 17.4 g/dL (13.0-18.0)
White cell count $39.4 \times 10^9/L$ (4-11)
White cell differential:
Neutrophils $22.2 \times 10^9/L$ (1.5 - 7)
Lymphocytes $1.1 \times 10^9/L$ (1.5 - 4)
Monocytes $1.0 \times 10^9/L$ (0 - 0.8)
Eosinophils $0.4 \times 10^9/L$ (0.04 - 0.4)
Basophils $2.1 \times 10^9/L$ (0 - 0.1)
Metamyelocytes $1.2 \times 10^9/L$
Myelocytes $10.9 \times 10^9/L$
Myeloblasts $1.3 \times 10^9/L$
Nucleated rbc 3 per 100 rbc
Platelet count $585 \times 10^9/L$ (150 - 400)

What is the most likely diagnosis?

- 1) Acute myeloid leukaemia [0]
- 2) Chronic myeloid leukaemia [100]
- 3) Essential thrombocythaemia [0]
- 4) Myelofibrosis [0]
- 5) Primary proliferative polycythaemia (rubra vera) [0]

The presentation is typical with vague symptoms of malaise and splenomegaly. The blood film also shows the typical high White Cell Count and there are all stages of myeloid cell maturation present in the peripheral blood. Thrombocythaemia is also seen in CML.

24- Anti-neutrophilic cytoplasmic autoantibodies:

- 1) positive only in Wegener's syndrome associated with renal disease [0]
- 2) cause neutropenia in SLE [0]
- 3) present in inflammatory bowel disease [100]
- 4) increased in systemic lupus erythematosus [0]
- 5) ANCA positive glomerulonephritis characteristically causes nephrotic syndrome [0]

85% of untreated subjects with Wegener's will have c-ANCA, and those with limited disease are less likely to have positive serology. p-ANCA is present in approximately 70% with ulcerative colitis and less than 20% of Crohn's patients. Neither p nor c-

ANCA is typical of SLE. Initial renal damage causes proteinuria (focal proliferative glomerulonephritis) but renal function can deteriorate rapidly, with development of acute focal necrotising glomerulonephritis).

25- A 55 year old male presents with anorexia and weight loss of 12 months duration. Over this year he has had two deep vein thromboses and had the last whilst his INR was 2. He remains on long-term warfarin therapy with an INR above 2.6. Examination reveals that he is pigmented and has a postural drop in his blood pressure of 15 mmHg.

Investigations are as follows:

sodium concentration 131 mmol/l

potassium 5.0 mmol/l

INR 3.0

A Short synacthen test reveals a baseline cortisol concentration at time 0 of 120 nmol/l which rises to 155 nmol/l after 30 minutes (Normal response >550 nmol/l).

Which single diagnosis would explain this patient's illness?

- 1) Addison's disease [0]
- 2) Anti-phospholipid syndrome [100]
- 3) Autoimmune Polyendocrine Syndrome (Schmidt's disease) [0]
- 4) Protein S deficiency [0]
- 5) Pituitary infarction [0]

With a history of recurrent DVT and confirmed hypoadrenalism this patient is likely to have the antiphospholipid syndrome. Antiphospholipid syndrome is a primary diagnosis or may co-exist with SLE. Anti-Cardiolipin antibodies or Lupus anticoagulant may be present. It is associated with arterial and venous thrombosis and has a predilection for the adrenal veins causing adrenal infarction with consequent hypoadrenalism. Addison's disease is an autoimmune phenomenon and is not associated with DVT. The pigmentation (due to increased ACTH in hypoadrenalism) would exclude pituitary infarction as the cause of the hypoadrenalism. Hypoadrenalism is not associated with protein S deficiency. Autoimmune Polyendocrine syndrome is associated with hypothyroidism, type 1 diabetes, Addison's disease.

26- In sickle cell disease:

- 1) The Sickledex test involves adding a reagent to blood, which allows the nature of the haemoglobinopathy to be determined [0]
 - 2) It is caused by the substitution of glutamic acid by valine at position 4 on the beta chain of haemoglobin [0]
 - 3) The erythrocytes of Haemoglobin AS patients can sickle at a PO₂ of 5 to 6 kPa (40 - 50 mmHg) [0]
 - 4) The erythrocytes of Haemoglobin SC patients may sickle at a PO₂ of 4 kPa (30 mmHg) [100]
 - 5) Exchange transfusions prior to major surgery on HbSS patients, aims to lower the HbS concentration to 60% [0]
-

Sickle cell disease is a haemoglobinopathy caused by the substitution of glutamic acid by valine at position 6 (from the N-terminal) of the beta chain. Inherited as an autosomal gene, heterozygous (HbAS) and homozygous (HbSS) forms exist. A low partial pressure of oxygen (PO₂) causes HbS to polymerise and precipitate, resulting in sickling of the erythrocyte. HbSS patients sickle at PO₂ of 5 - 6 kPa and HbAS patients sickle at PO₂ of 2.5 - 4 kPa. A mild disease is produced when heterozygotes for HbS combine with other haemoglobins e.g. Haemoglobin C, thus creating HbSC. Sickling occurs at around 4 kPa. Diagnosis of sickle cell disease requires the detection of HbS. The Sickledex test involves the addition of reagent to blood; turbidity confirming the presence of HbS, but it gives no information on other haemoglobins. Haemoglobin electrophoresis is the only investigation that determines the nature of the haemoglobinopathy.

27- Which of the following conditions is most likely to be associated with thrombocytopenia?

- 1) haemophilia A [0]
- 2) hereditary haemorrhagic telangiectasia [0]
- 3) pernicious anaemia [100]
- 4) porphyria [0]
- 5) uraemia [0]

Pernicious anaemia is usually a megaloblastic anaemia but may also be associated with a pancytopenia.

The platelet count is usually normal in chronic renal failure but there is a platelet function abnormality.

PERNICIOUS ANEMIA

Male : Female ratio 5 : 8

Usually seen in the elderly. Peak incidence at 60 years, unlikely under 40 years.

North Europeans most commonly affected. Associated with blue eyes, early grey hair and blood group A.

90% have anti-parietal cell antibodies (found in 15% of the normal population), 60% have intrinsic factor (IF) antibodies (more specific for pernicious anemia) and 35% have antibodies to the ileal binding site for IF. B12 not absorbed and hence megaloblastic, macrocytic anaemia.

Features

Common :-

tiredness and weakness (90%)

dyspnoea (70%)

paraesthesiae (40%)

sore red tongue (25%)

diarrhoea

dementia

Rarer :-

retinal haemorrhages
lemon tinge to skin
retrobulbar neuritis
mild splenomegaly
mild pyrexia < 38°C

Treatment with steroids has been reported to reverse the disease both pathologically and clinically. Gastric parietal cell atrophy is characteristic, gastrin levels are high. There is an increased incidence of gastric malignancy. Hypokalaemia is common as vitamin B12 replacement becomes established.

28- A 56 year old female presents at the general practitioner with weakness. A full blood count reveals a haemoglobin concentration of 10.5 g/dl and an mean cell volume of 104 fl, but no other abnormality. Which of the following may account for this?

- 1) Hormone replacement therapy [0]
- 2) Thyrotoxicosis [0]
- 3) Ulcerative colitis [0]
- 4) Zollinger-Ellison syndrome [0]
- 5) Scurvy [100]

Vitamin C deficiency is associated with a macrocytosis and slight anaemia. HRT is more likely to be associated with Fe deficiency anaemia as is Zollinger-Ellison syndrome and ulcerative colitis. Hypothyroidism is associated with macrocytosis.

29- A 20-year-old caucasian student returns from Ghana with a spiking temperature and nocturnal sweats. She has 0.5% of red blood cells infected with plasmodium falciparum. Select one of the following answers relating to quinine therapy in this case:

- 1) quinine contraindicated in those taking mefloquine prophylactically [0]
- 2) quinine must always be given parenterally initially [0]
- 3) pregnancy is a contraindication for quinine [0]
- 4) glucose level should be monitored in those on treatment with quinine [100]
- 5) dose of quinine should be reduced in liver impairment [0]

Severe malaria is indicated by more than 1% of RBC infected. Hypoglycaemia is an important side-effect of quinine therapy and should be monitored in those having intravenous quinine. The initial dose should NOT be reduced in those severely ill with renal/hepatic impairment. Intravenous infusion of quinine reserved for severe or cerebral malaria (most deaths from M.falciparum occur in first 96 hours of starting treatment).

30 -Which of the following statements concerning abnormalities of the haemoglobin molecule is true?

- 1) Alpha thalassaemia is due to a deficiency of beta-chain production [0]
- 2) HbS is caused by a single base mutation on the beta-chain [100]
- 3) genes for the alpha and beta chains are located on the same chromosome [0]
- 4) in thalassaemia persistence of HbF is an adverse prognostic sign [0]
- 5) oligoneoclitide probes may assist in the diagnosis of haemoglobinopathies [0]

Alpha Thalassaemia is due to abnormalities of the alpha chain. Persistence of HbF has survival advantages in severely affected subjects. C-alpha 16, beta 11. e-Hb electrophoresis(Dr Shu Ho)

31- Which ONE statement is true regarding the treatment of iron deficiency anaemia:

- 1) iron is absorbed in the distal jejunum [0]
- 2) absorption of iron is increased by ascorbic acid [100]
- 3) sustained release iron is a useful way of giving larger doses [0]
- 4) ferrous sulphate 200mg has less elemental iron than the same dose of ferrous gluconate [0]
- 5) parenteral iron is indicated when the anaemia responds slowly to oral iron [0]

1 - iron is absorbed in the upper small intestine. 2 - absorption of oral iron is improved by ascorbic acid. 3 - sustained release preparations may improve tolerance of oral iron but do not aid absorption. 4 - ferrous sulphate has more elemental iron by mass. 5 - parenteral iron acts no faster than oral iron. It is indicated when oral iron cannot be tolerated or is not absorbed.

32- Erythropoietin therapy causes

- 1) Benign intracranial hypertension [0]
- 2) Myositis [0]
- 3) Hypotension [0]
- 4) Seizures [100]
- 5) Osteoporosis [0]

Hypertension is a frequent problem and may induce seizures. A particular symptom is the onset of sudden stabbing migraine-like headache and should raise awareness to the possibility of hypertensive crisis. Other adverse effects of treatment with erythropoietin include hyperkalaemia in uraemic patients, increased PCV (especially with misuse by normal individuals), thrombocythaemia, shunt thrombosis, induction of iron deficiency, skin rashes, urticaria and flu-like illness.

33- Which of the following is a feature of hereditary haemorrhagic telangiectasia?

- 1) a good response to oestrogen therapy [0]
- 2) cerebral arteriovenous malformations [100]
- 3) GI haemorrhage as the usual presenting feature [0]
- 4) telangiectasia of the mucous membranes, but not the skin [0]
- 5) tendency of lesions to become less obvious with age [0]

In hereditary haemorrhagic telangiectasia there may also be pulmonary AV malformations.

Epistaxis, not GI haemorrhage, is the usual presenting feature. Lesions become more obvious with age and affect mucous membranes as well as skin. Oestrogen therapy is sometimes advocated but the effect, if any, is small.

34- Spleen enlargement is invariably seen in which of the following?

- 1) Acute myeloid leukaemia [0]
- 2) Idiopathic thrombocytopaenic purpura [0]
- 3) Myeloproliferative disorders [0]
- 4) Myelosclerosis [0]
- 5) Polycythaemia rubra vera [100]

A soft thin spleen may be palpable in 10% of neonates, 10% of normal children, and 5% of adolescents. In most individuals, the spleen must be 2-3 times its normal size before it is palpable.

Common causes of splenomegaly include:

Infection:

Bacterial: typhoid, endocarditis, septicaemia, abscess.

Viral: EBV, CMV and others.

Protozoal: malaria, toxoplasmosis.

Haematological: haemolytic anaemia (congenital or acquired), extramedullary haematopoiesis: thalassaemia, osteopetrosis, myelofibrosis.

Oncological:

Malignant: Leukaemia, lymphoma, metastatic disease.

Benign: Haemangioma, hamartoma.

Infiltration/Storage:

Lipidoses: Niemann-Pick, Gaucher.

Mucopolysaccharidoses

Infiltration: histiocytosis.

Congestion:

Cirrhosis or hepatic fibrosis.

Hepatic, portal or splenic vein obstruction.

Congestive heart failure.

Cysts: - Congenital (true cysts) or acquired (pseudocysts).

Other: - SLE, sarcoid, rheumatoid arthritis. Although splenic enlargement is seen in all these conditions, this is not invariable.

However, in polycythaemia rubra vera, the diagnostic criteria are increased total red blood cell volume, an arterial oxygen saturation of greater than or equal to 92%, and splenomegaly. The disorder in this condition is that erythroid precursors do not require erythropoietin to stimulate growth.

35- A 24 year old male presents after developing a bluish discolouration of the body, lips and nails. He denies any relevant past medical history. Examination reveals a central cyanosis and a grey complexion.

Investigation revealed:

Haemoglobin 17.0 g/dL (13.0-18.0)

PaO₂ 13.0 kPa (11.3-12.6)

SaO₂ (using an oximeter) 85% (>95)

What is the most likely diagnosis?

- 1) Argyria [0]
- 2) Cyanotic congenital heart disease [0]
- 3) Haemochromatosis [0]
- 4) Methaemoglobinaemia [100]
- 5) Methylene blue poisoning [0]

This patient is otherwise well and has no specific features of congenital heart disease (clubbing etc). He appears desaturated with sats of 85% yet good pO₂. This is a typical description of methaemoglobinaemia which is the accumulation of reversibly oxidised methaemoglobin causing reduced oxygen affinity of the Hb molecule with consequent cyanosis. It can occur due to an inherited condition or as a consequence of drugs such as nitrites.

Argyria is colloidal silver toxicity. more ...

36- An 18 year old Asian female is noted to have gingival hypertrophy by her dentist. Which of the following is most likely to be responsible for her presentation?

- 1) carbamazepine [0]
- 2) scurvy [0]
- 3) lead poisoning [0]
- 4) phenytoin [100]
- 5) sodium valproate [0]

The inclusion of 'asian' descent in this question is intended as a distractor. Gum hypertrophy may be seen in conditions such as acute myeloid leukaemias and with drugs such as phenytoin. Scurvy (vitamin C deficiency) is associated with bleeding gums. Lead toxicity is associated with pigmentation of the gingiva. Carbamazepine is not associated with gingival hyperplasia but recognised SEs include ataxia, drowsiness and blood dyscrasias.

37- B cell CLL

- 1) thrombocytopenia often autoimmune [0]
- 2) reduced immunoglobulins are a risk for recurrent bacterial infections [100]
- 3) Stage A disease should be treated with chemotherapy [0]
- 4) late transformation to ALL occur in the majority of patients [0]
- 5) diffuse infiltration of bone marrow indicates good prognosis [0]

Immune thrombocytopenia only in 2%. Hypogammaglobulinaemia predisposes to encapsulated bacteria eg pneumococcus/H influenzae - causes death in 30% cases. Two transformations in CLL - CLL/PL (10%) and Richter syndrome (5% = high grade non-hodgkins lymphoma). Treatment only for Stage B, C and A with clear evidence of progression.

38- A 35-year-old woman with a history of recurrent anaemia was noted to have target cells and Howell-Jolly bodies on a blood film examination.

Investigations revealed:

Haemoglobin 7.0 g/dL (11.3-16.5)
MCV 77 fL (80-96)
MCH 26.2 pg (28-32)
Serum B12 140 ug/L (160-760)
Red cell folate 95 ug/L (160-640)
Serum ferritin 10 ug/L (15-300)

What disease specific antibody is most likely to be present?

- 1) Anti-endomysial [100]
- 2) Anti-gastric parietal cell [0]
- 3) Anti-glutamic acid decarboxylase [0]
- 4) Anti-intrinsic factor [0]
- 5) Antimitochondrial [0]

The patient has hyposplenism as suggested by the blood film and a mixed anaemia. Coeliac disease could therefore fit the above picture with anti-endomysial antibodies being the most appropriate selection from the above list. Antimitochondrial antibodies are seen in PBC, anti-gastric and anti intrinsic Abs are seen in pernicious anaemia. Anti-GAD abs are found in auto-immune DM.

Screening for coeliac disease should include high-risk groups such as anaemia (iron or folate deficiency), hyposplenism, reduced bone density and infertility.

"Anti-endomysial IgA antibodies are extremely specific markers for CD and for dermatitis herpetiformis. These antibodies are directed to a component of the gut endomysium (connective tissue surrounding smooth muscle fibers of the gut)."

(Further reading)

http://www.labodia.com/en/coeliac_disease/review_coeliac_english.htm#antibodytesting

39- A 26-year-old woman presented in acute shock at 35 weeks of pregnancy with profuse vaginal bleeding. She had suffered two previous miscarriages. She had a pulse of 110 beats per minute, blood pressure of 110/84 mmHg and no foetal heart sounds were audible.

Investigations revealed:

haemoglobin concentration 9.5g/dL (11.5 – 16.5)
platelet count 66 X 10⁹/L (150 – 400)
prothrombin time 21 s (11.5 – 15.5)
activated partial thromboplastin time (APTT) 52 s (30 – 40)
fibrinogen concentration 0.5 g/L (2 – 4)

What is the most appropriate next step in management?

- 1) antithrombin III infusion [0]
- 2) fibrinogen replacement infusion (cryoprecipitate) [100]
- 3) intravenous heparin [0]

- 4) platelet transfusion [0]
- 5) transfusion of two units group O Rhesus D negative blood [0]

The clinical picture is disseminated intravascular coagulation. When bleeding is the major problem, the aim is to maintain the prothrombin and activated thromboplastin time at a ratio of 1.5 times of the control and the fibrinogen level above 1g/L. Platelet transfusion is recommended if the count is less than $50 \times 10^9 /L$. Anaemia is not very severe so in this case fibrinogen replacement would be the appropriate choice. (Ref: Oxford textbook of Medicine)

40- Which of the following statements regarding lymphomas in childhood is correct?

- 1) Hodgkin's disease is more common than non-Hodgkin's under the age of 5 years. [0]
- 2) Hodgkin's disease has equal sex incidence. [0]
- 3) lymphocyte-predominant Hodgkin's disease has the worse prognosis. [0]
- 4) the nodular sclerosing variety is the most common form of Hodgkin's disease. [100]
- 5) the most common presenting clinical sign is splenomegaly. [0]

Hodgkin's lymphoma occurs in four forms: (1) lymphocyte-predominant (10-20%) with the best prognosis; (2) nodular sclerosing (50%) which is the most common form; (3) mixed cellularity (40-50%) which is most likely to have extranodal disease at presentation; and (4) lymphocyte depleted (<10%) which is the rarest type with the worst prognosis. Hodgkin's disease is rarely found in children aged less than 5 years old (male:female ratio=2:1) and peaks at between 15 and 34 years. Non-Hodgkin's disease is more common in younger children (male:female ratio=3:1). The most common presenting clinical sign is enlarged cervical lymph nodes. From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 15 © WB Saunders. Reproduced with permission.

Infectious Diseases

1- A 26-year-old previously healthy woman has the sudden onset of mental confusion. She has a seizure and is brought to the hospital. Her vital signs show blood pressure 100/60 mm Hg, temperature 37 C., pulse 89, and respirations 22. A lumbar puncture reveals a normal opening pressure, and clear, colorless cerebrospinal fluid is obtained with 1 RBC and 20 WBC's (all lymphocytes), with normal glucose and protein. An MRI scan reveals swelling of the right temporal lobe with hemorrhagic areas. Which of the following infectious agents is the most likely cause for these findings?

- 1) Haemophilus influenzae [0]
- 2) Herpes simplex virus [100]
- 3) Influenza virus [0]
- 4) Mycobacterium tuberculosis [0]
- 5) Neisseria meningitidis [0]

Haemorrhagic lesions of the temporal lobe are typical for Herpes simplex virus infection. Hemophilus influenzae is the organism most associated with meningitis in

children. Neisseria meningitidis would cause meningitis - however, in this case there are lymphocytes not neutrophils in the CSF and a normal not low glucose.

2- A 45-year-old woman was diagnosed with bacterial endocarditis. What is the characteristic fundoscopic feature of this disease?

- 1) Cherry red macula [0]
- 2) Janeway lesions [0]
- 3) Macular star [0]
- 4) Retinal artery aneurysms [0]
- 5) Roth's spots [100]

Roth's spots are the fundoscopic hallmark of bacterial endocarditis. Other features include Osler's nodes (tender subcutaneous nodules caused by immune complex deposition), and Janeway lesions (caused by infective emboli in the skin).

3- A 40 year old single man returned from holiday in Europe with mild bloody diarrhoea which had lasted for two weeks. He had lost 2.5 kg in weight, had occasional lower abdominal cramping discomfort and a painful swelling of his left knee.

What is the most likely diagnosis?

- 1) amoebiasis [0]
- 2) campylobacter infection [100]
- 3) Crohn's disease [0]
- 4) gonococcal septicaemia [0]
- 5) ulcerative colitis [0]

Campylobacter infection is one of the commonest causes of inflammatory diarrhoea. Abdominal pain is often a prominent feature of the illness, frequently localising to the right iliac fossa. Diarrhoea may be mild or very severe, often with passage of blood. Symptoms may last a week or longer. Reactive arthritis and Reiter's syndrome can develop following infection with a number of enteric pathogens, including Shigella, Salmonella, Campylobacter and Yersinia. more ...

4- The morphological appearance of Pneumocystis carinii infection in the lung is best characterised as which one of the following?

- 1) A bronchopneumonia with abscess formation [0]
- 2) A haemorrhagic and necrotizing pneumonia [0]
- 3) An acute respiratory distress syndrome (ARDS) with widespread hyaline membrane formation [0]
- 4) An interstitial pneumonitis with foamy intra-alveolar exudate [100]
- 5) An organizing bronchopneumonia [0]

Pneumocystis carinii is a fungal organism. In PC pneumonia, the organism is confined to the alveolar space of the lung and produce debris and cysts in the alveolar space with interstitial infiltration of lymphocytes and plasma cells. As a result, it can cause profound disturbance of oxygen exchange and fatal hypoxaemia if left untreated.

5- A 70-year-old man presented to his GP with a two-day history of increasing confusion. He also complained of a headache. He was febrile on examination; nuchal rigidity was noted. A lumbar puncture was performed and CSF microscopy revealed:

WBC 800 cells/mL (<5) 90% neutrophils. A few Gram-positive diplococci were also noted.

What is the cause of his meningitis?

- 1) *Cryptococcus neoformans* [0]
- 2) *Haemophilus influenzae* [0]
- 3) *Listeria monocytogenes* [0]
- 4) *Neisseria meningitidis* [0]
- 5) *Streptococcus pneumoniae* [100]

A question on Gram-staining properties of organisms causing meningitis.
Pneumococcal meningitis is commoner in older patients.

6- A 19-year-old man returned to the UK two weeks after working in a refugee camp in sub-Saharan Africa. On examination he was febrile, dyspnoeic and widespread inspiratory crackles were present. He had an extensive maculo-papular rash, conjunctivitis, generalized stomatitis and some bluish-grey spots on the buccal mucosa.

What is the most likely diagnosis?

- 1) Epidemic typhus [0]
- 2) Epstein Barr virus infection [0]
- 3) Leptospirosis [0]
- 4) Measles [100]
- 5) Parvovirus infection [0]

Although seldom seen in countries in which a vaccine is available, measles is a major health problem in refugee camps in Africa. The clinical picture described is characteristic. The major complications of measles involve the respiratory tract and CNS. Pneumonia may be caused by the virus itself, or through bacterial superinfection.

7- Twenty of thirty patients in an adult ward develop colicky abdominal pain and diarrhoea without vomiting between 21:00 and 01:00 hrs. Meat stew was served for lunch at noon. Which of the following is the likely diagnosis?

- 1) *Bacillus Cereus* [0]
- 2) *Clostridium perfringens* [100]
- 3) Enterotoxigenic *E.Coli* [0]
- 4) Enterovirus [0]
- 5) *Staphylococcus Aureus* [0]

This food poisoning with no vomiting and an incubation period between 9-13 hrs incubation is typical of *clostridium perfringens*. The history is too long for a

typical Staph Aureus infection (vomiting a typical feature, incubation period 1-6 hrs) and rather short of enterovirus (24 hrs). The predominant symptom of B.Cereus (inc period 1-5 hrs) is marked vomiting with diarrhoea occasionally seen. E.Coli infection has an incubation period of 12-24hrs and is also associated with marked vomiting. Supportive treatment is all that is generally required with symptoms resolving after 24 hrs.

8- Which of the following is true of tetanus?

- 1) failure to culture Clostridium tetani from the wound would make the diagnosis doubtful [0]
- 2) infection confers lifelong immunity [0]
- 3) there is a characteristic EEG [0]
- 4) Clostridium-specific intravenous immunoglobulin is of no benefit once spasm has started [0]
- 5) cephalic tetanus causes severe dysphagia [100]

a-absence of a wound does not exclude tetanus. b-patients need to be actively immunized after recovery. c-The toxin tetanospasmin doesn't cross the blood brain barrier, it diffuses through the blood to bind to receptors containing gangliosides on the neuronal membranes of presynaptic nerve terminals in muscles. The toxin does reach the brain by axonal transport. d-it is ineffective once the toxin is attached to nervous tissue but may prevent progression. e-Cephalic meaning involving the cranial nerves usually from a wound on the head and neck. May be confused with rabies but hydrophobia never occurs. (OTM, 3e, 7.11.20)

9- A 19-year-old male student attends casualty complaining of an urethral discharge. Gram stain shows numerous neutrophils, some of which contain gram-negative intracellular diplococci. The patient is treated with Ceftriaxone, 250 mg as an im injection. Five days later, the patient re-attends with persisting discharge. Which of the following is the most likely cause of this discharge?

- 1) Chlamydia trachomatis [100]
- 2) Penicillin-resistant Neisseria gonorrhoeae [0]
- 3) Re-infection with Neisseria gonorrhoeae [0]
- 4) Ureaplasma urealyticum [0]
- 5) Urethral stricture [0]

This patient has been adequately treated for gonorrhoea and a persistent discharge would be unusual unless as is often the case, there is a co-infection. The patient is likely to have a non-specific urethritis due to Chlamydia trachomatis, requiring treatment with either doxycycline or erythromycin for 7-14 days.

10- A 20 year-old-woman presented with a solitary, crusted, thickened lesion on her face one month after returning from a holiday in Central America.

What is the most likely diagnosis?

- 1) Cutaneous anthrax [0]
- 2) Cutaneous leishmaniasis [100]
- 3) Impetigo [0]

- 4) Leprosy [0]
- 5) Onchocerciasis [0]

The patient has American ('New world') cutaneous leishmaniasis. The causative agents are of the *Leishmania* species, including *L. braziliensis*, *L. mexicana*, *L. panamensis* and others. The incubation period is very variable, ranging from 2 weeks to several months. A variety of clinical manifestations are described, including single or multiple lesions or mucosal disease (espundia). Lesions usually occur on sun-exposed areas. Treatment is usually with pentavalent antimonial drugs.

11- A 35-year-old man presented with cellulitis of his right leg. On examination he was mildly confused and febrile (40.1°C) with a pulse was 120 / minute and BP 80/55 mmHg. He was treated with intravenous benzylpenicillin and flucloxacillin. Group A *Streptococcus* was isolated from two sets of blood cultures. There was no significant clinical improvement after 24 hours.

What antibiotic should be added?

- 1) Ciprofloxacin [0]
- 2) Clindamycin [100]
- 3) Gentamicin [0]
- 4) Rifampicin [0]
- 5) Vancomycin [0]

The patient has a severe cellulitis with features of Streptococcal toxic shock syndrome. Streptococcal TSS is mediated via Streptococcal exotoxins. Although clindamycin is a bacteriostatic antibiotic, it acts by switching-off protein synthesis within bacteria; this in turn will lead to decreased exotoxin expression, thereby removing the mediators of TSS.

12- Regarding the epidemiology of infections, which of the following statements is true?

- 1) Resistant vivax malaria is a major problem in Kenya. [0]
- 2) Diphtheria has been eradicated in most parts of the world. [0]
- 3) Polio has been eradicated in most parts of the world. [100]
- 4) Tetanus has been eradicated in most parts of the world. [0]
- 5) The AIDS epidemic seems to be declining worldwide. [0]

Falciparum is the major resistance problem in sub-Saharan Africa. Most vivax is Chloroquine sensitive, though resistant strains are appearing in New Guinea and Indonesia. Diphtheria is still prevalent in many parts of the world. An upsurge in polio is now nearing eradication. Tetanus is still common. AIDS is increasing inexorably.

13- A 22 year old male presents with generalised pruritus of six weeks duration. Examination reveals little except for erythematous papules between the fingers. Which of the following therapies would be most appropriate for this patient?

- 1) Astemizole [0]
- 2) Calamine lotion [0]

- 3) Chlorpromazine [0]
- 4) Ciprofloxacin [0]
- 5) Permethrin cream [100]

This patient has scabies, a highly contagious disease caused by the mite, *Sarcoptes Scabiei*. Appropriate treatment includes Permethrin cream topical Benzyl Benzoate or malathion.

14- In HIV disease, patients first become susceptible to infection with *Pneumocystis carinii* when the CD4 cell count falls to:

- 1) <1000 cells/mm³ [0]
- 2) <500 cells/mm³ [0]
- 3) <350 cells/mm³ [0]
- 4) <200 cells/mm³ [100]
- 5) <50 cells/mm³ [0]

15- Which of the following is true concerning a hepatitis E infection?

- 1) It can be transmitted with hepatitis B. [0]
- 2) It is a recognised cause of chronic liver disease. [0]
- 3) CT scan of the liver with contrast shows diagnostic appearances. [0]
- 4) The incidence of chronic liver disease is reduced by administration of alpha interferon. [0]
- 5) It does not result in a carrier state. [100]

Five hepatitis viruses form a heterogeneous group causing similar clinical illnesses. Hepatitis A, C, D, and E are all RNA viruses coming from 4 different families; and hepatitis B is a DNA virus. Hepatitis A & E cause acute illness, with the former causing most hepatitis in childhood and hepatitis E being very rare. Hepatitis B, C, and D cause chronic morbidity and mortality, with B causing a third of cases, hepatitis C a fifth of cases, and D being very rare. Hepatitis D illness cannot occur without B as a helper virus. Hepatitis B can be treated with interferon-alpha, which improves liver disease. Copyright © 2002 Dr Colin Melville

16- Which statement regarding tinea capitis is correct?

- 1) It is most commonly caused by the fungus *microsporum canis*. [0]
- 2) Its presence should suggest immunological deficiency. [0]
- 3) It often results in permanent alopecia. [0]
- 4) It causes patches that fluoresce dull green under Wood's lamp. [100]
- 5) It is effectively treated with topical Nystatin ointment. [0]

Tinea capitis is a dermatophyte infection of the scalp most often caused by *trichophyton tonsurans*, and occasionally by *microsporum canis*. It is commonest in areas of socio-economic deprivation. *M. canis* is a zoophilic species acquired from cats and dogs. There is initially a small papule at the base of the hair follicle which spread peripherally forming a scaly circular plaque (ringworm) within which there are brittle, broken infected hairs (exclamation mark hairs). Confluent patches of alopecia develop and there may be pruritis. Sometimes a severe inflammatory response

produces an elevated boggy granulomatous mass (kerion), studded with sterile pustules. There may be fever and regional lymphadenopathy, and occasionally permanent scarring and alopecia may result. The crusted patches fluoresce dull green under Wood's light. Microscopic examination of a KOH preparation shows tiny spores and the fungi may be grown in Sabouraud medium with antibiotics. Oral griseofulvin for 2-3 months is required, or Ketoconazole for resistant cases.

17- A 25-year-old Turkish woman arrived in the UK with a three month history of weight loss and intermittent fevers. On examination, the patient was emaciated, febrile (39°C) and pale, and an enlarged liver (5 cm below the costal margin) and spleen (10cm below the costal margin) were present. Investigations revealed:

Haemoglobin 7.2g/dL (11.5-16.5)
White cell count $2.4 \times 10^9/L$ (4-11)
Platelet count $117 \times 10^9/L$ (150-400)

Thick and thin films no parasites identified

CXR normal

What is the most likely diagnosis?

- 1) HIV infection [0]
- 2) Infectious mononucleosis [0]
- 3) Malaria [0]
- 4) Miliary tuberculosis [0]
- 5) Visceral leishmaniasis [100]

The ethnic origin and clinical history are typical of visceral leishmaniasis. The causative agent is usually *Leishmania donovani*. Fever, malaise, weakness and weight loss are common. Hepatosplenomegaly develops gradually and may be massive. With time, the skin develops a grey colour, and gives rise to the Indian name of the disease –'kala-azar' – meaning black fever. Anaemia is a common finding and may be severe.

18- A 22-year-old female student attended Casualty complaining of fever and rigors for two days. She had returned from a sabbatical in Africa six weeks previously. She was febrile (39.9°C) and a mild petechial rash was also noted. Laboratory investigations showed.

Hb 10.1 g/dL (11.5-16.5)
WBC $3.0 \times 10^9/L$ (4-11)
Platelets $115 \times 10^9/L$ (150-400)
Prothrombin time Normal

What is the most likely diagnosis?

- 1) Acute HIV infection (seroconversion illness) [100]
- 2) Cytomegalovirus infection [0]
- 3) Dengue fever [0]
- 4) *Plasmodium falciparum* malaria [0]
- 5) Typhoid fever [0]

A difficult question that partly hinges on the incubation times of these illness. The incubation time is too long for dengue, typhoid and falciparum malaria. The presentation is not typical of CMV. Acute HIV presents 2 weeks – 3 months after exposure to the virus; the illness typically consists of fever, arthritis, rash and lymphadenopathy. The presentation given here is not characteristic of acute HIV, but is the most reasonable of the options listed.

19- A 20-year-old caucasian student returns from Ghana with a spiking temperature and nocturnal sweats. She has 0.5% of red blood cells infected with plasmodium falciparum. Select one of the following answers relating to quinine therapy in this case:

- 1) quinine contraindicated in those taking mefloquine prophylactically [0]
- 2) quinine must always be given parenterally initially [0]
- 3) pregnancy is a contraindication for quinine [0]
- 4) glucose level should be monitored in those on treatment with quinine [100]
- 5) dose of quinine should be reduced in liver impairment [0]

Severe malaria is indicated by more than 1% of RBC infected. Hypoglycaemia is an important side-effect of quinine therapy and should be monitored in those having intravenous quinine. The initial dose should NOT be reduced in those severely ill with renal/hepatic impairment. Intravenous infusion of quinine reserved for severe or cerebral malaria (most deaths from M.falciparum occur in first 96 hours of starting treatment).

20- Which of the following statements is true about immunological reactions?

- 1) Serum sickness is caused by a type II reaction. [0]
- 2) Grave's Disease is caused by a type IV reaction. [0]
- 3) Angio-neurotic oedema is the most severe form of type I reaction. [0]
- 4) Urticaria usually responds to Cimetidine. [0]
- 5) Deficiencies in the terminal components of complement increase the risk of meningococcal disease. [100]

Serum sickness is due to circulating antibody-antigen complexes (Type III). Grave's Disease is due to stimulating antibody (Type VI). The most severe variety of Type I reaction is anaphylaxis, with angio-oedema an intermediate reaction associated with wheeze and swelling of the lips and severe urticaria. These reactions are mediated by histamine 1 receptor stimulation. Congenital C1 inhibitor deficiency is also caused hereditary angio-oedema. Deficiencies in C1r, s, and 2-4 result in vasculitides; while deficiencies in C2, 3 and 5-8 are associated with an increased risk of septicaemia.

21- A 41-year-old African man has a history of multiple episodes of sudden onset of severe abdominal pain and back pain lasting for hours. Each time this happens, his peripheral blood smear demonstrates numerous sickled erythrocytes.

A haemoglobin electrophoresis shows 94% Hgb S, 5% Hgb F, and 1% Hgb A2. He now has increasing pain in his right groin radiating to the anterior aspect of the thigh

and to the knee. His temperature was 38°C and examination of his hip revealed pain on internal rotation. A radiograph reveals irregular bony destruction of the femoral head.

The most likely organism to be responsible for these findings is?

- 1) *Candida albicans* [0]
- 2) *Clostridium perfringens* [0]
- 3) Group B streptococcus [0]
- 4) *Salmonella* species [100]
- 5) *Yersinia pestis* [0]

Salmonella osteomyelitis is seen in patients with sickle cell anemia. Other organisms that are frequent causes for osteomyelitis with sickle cell anemia include *Staphylococcus aureus* and gram negatives such as *Klebsiella*.

22- A 35 year old woman with alcoholic cirrhosis is admitted with deteriorating encephalopathy and abdominal discomfort. An ascitic tap revealed a polymorphonuclear cell count of 350 cells per mm³.

Which of the following is the most appropriate therapy?

- 1) Intravenous amoxicillin [0]
- 2) Intravenous cefotaxime [100]
- 3) Intravenous metronidazole [0]
- 4) Oral neomycin [0]
- 5) Oral norfloxacin [0]

This lady has Spontaneous Bacterial Peritonitis as suggested by the typical history, ascites and raised polymorphonuclear count within the ascitic tap. It is most commonly seen in alcoholic cirrhosis and the causative organism is usually *E. Coli*, *Klebsiella*, *S. Pneumoniae* or *Enterococci*. (Compare this with the mixed growth seen in other forms of peritonitis). Sending some ascitic fluid in blood culture bottles increases the yield. Initial treatment is with broad spectrum antibiotics such as cefotaxime. Norfloxacin is recommended for short term prophylaxis.

23- A 36 year old woman presents with dyspnoea, cough and fever. Crackles are heard on auscultation of the lungs. Circulating precipitans to *Micropolyspora faeni* are positive. Which of the following is the most likely diagnosis?

- 1) Malt workers' lung [0]
- 2) Pigeon fanciers' lung [0]
- 3) Allergic Bronchopulmonary Aspergillosis [0]
- 4) Brucellosis [0]
- 5) Farmers' lung [100]

Spores of *Micropolyspora faeni* found in moldy hay/straw are responsible for Farmer's Lung.

24- Which of the following would be indicated in the treatment of a 30 year old HIV positive male with pneumocystis carinii pneumonia? Blood gases reveal a P02 of 55mmHg whilst breathing 28% oxygen.

- 1) Atovaquone [0]
- 2) Clindamycin [0]
- 3) Leucovirin [0]
- 4) Pentamidine [0]
- 5) Trimethoprim-sulphamethoxazole [100]

This patient has severe PCP as suggested by the hypoxia (pO2 less than 70). He should be treated with high percentage oxygen and the drug of choice is high dose IV cotrimoxazole (trimethoprim-sulphamethoxazole). If allergic to co-trimoxazole, IV pentamidine or Clindamycin are appropriate. IV leucovirin and oral atovaquone are further options but are not first line therapies. Prednisolone has been shown to reduce mortality substantially in patients with a PO2< 60mmHg.

25- Two strains of Escherichia coli are isolated and both are resistant to ampicillin. Strain A retains its resistance to ampicillin when grown form multiple generations in the absence of ampicillin. However strain B loses its resistance when grown in the absence of ampicillin. Which of the following best explains the loss of antibiotic resistance in strain B?

- 1) Changes in the bacterial DNA gyrase [0]
- 2) Downregulation of the resistance gene [0]
- 3) Loss of a plasmid containing the resistance gene [100]
- 4) Mutations in the resistance gene [0]
- 5) Transposition of another sequence into the resistance gene [0]

Bacteria develop resistance to antibiotics by gaining genes that encode for particular proteins that offer protection to the organism. Sometimes this is by mutation and other times the gene may be acquired from another bacterial species. The genes are usually found in plasmids - circular segments of DNA separate from the bacterial chromosome. Plasmids can easily spread from one bacteria to another - a sort of resistance package that bacteria can share.

26- A 63 year old patient with known alcohol related cirrhosis presented with ascites, abdominal tenderness and peripheral oedema. A diagnostic tap revealed a neutrophil count of 400/mm3 (normal <250mm3).

Which of the following would be of most immediate benefit?

- 1) fluid restriction and a no added salt diet [0]
- 2) intravenous antibiotics [100]
- 3) oral spironolactone [0]
- 4) therapeutic paracentesis [0]
- 5) trans-jugular intrahepatic porto-systemic shunt [0]

This man has spontaneous bacterial peritonitis (SBP). Appropriate treatment is IV antibiotics. He is likely to have a decreased intravascular volume and require IV

albumin as volume expansion. Fluid restriction, diuretics, or large volume paracentesis are likely to cause further hypovolaemia and precipitate renal failure. There is no stated indication for a TIPSS, indications are: diuretic resistant ascites, intractable portal hypertensive bleeding and hepato-renal failure.

27- Which of the following is correct regarding infection with Salmonella typhi

- 1) children are particularly likely to become carriers [0]
- 2) most carriers are female [100]
- 3) faecal culture is almost always positive during the first week of illness [0]
- 4) relapse does not occur if antibiotics are taken for 2 weeks [0]
- 5) vaccinated individuals who develop the disease will have a mild illness [0]

Children are rarely chronic carriers of the organism although for some unknown reason females are more commonly long-term carriers than males (Remember Typhoid Mary). c-only 50% of cases, e-higher threshold but same disease.

28- Which of the following is a true of cutaneous anthrax?

- 1) causes a black eschar which overlies pus [0]
- 2) lesions are usually painful and tender [0]
- 3) lesions are associated with marked oedema [100]
- 4) Mortality is approximately 20% despite antibiotic therapy [0]
- 5) Is very likely to occur in subjects exposed to anthrax spores [0]

Anthrax is caused by B Anthracis a gram positive rod. Cutaneous anthrax is associated with a black eschar without pus, tend to be painless and have widespread oedema. Without antibiotics mortality is of the order of 20%, but with antibiotics, mortality is low, which contrasts with pulmonary anthrax.

29- Toxoplasmosis

- 1) can cause fits in AIDS [100]
- 2) infection in the first trimester of pregnancy is seldom harmful to fetus [0]
- 3) undercooked meat is an important cause of infection [0]
- 4) infection usually by respiration [0]
- 5) prophylactic immunoglobulins should be given to pregnant women if their IgM anti-toxoplasma antibodies detected. [0]

Transmission of Toxoplasma gondii after ingestion of cysts. Definitive host is the cat. Oocysts excreted with cat faeces can remain in soil for months. Risk of fetopathy reduced by > 50% if spiramycin given to mothers, which can prevent maternal-fetal transmission.

30- A 26-year-old man with a history of alcohol and drug abuse was admitted with a 14 day history of fever, cough and fatigue. He was emaciated. His temperature was 39.4°C. Cervical and axillary lymphadenopathy were present. Chest X-ray revealed bilateral areas of pulmonary shadowing. Which of the following is the most likely diagnosis?

- 1) alcoholic cardiomyopathy [0]

- 2) pneumococcal pneumonia [0]
- 3) pneumocystis pneumonia [100]
- 4) pulmonary tuberculosis [0]
- 5) tricuspid endocarditis [0]

Pneumocystis carinii is the most common opportunistic infection in AIDS. This patient is at risk of HIV with the history of drug abuse. Persistent generalised lymphadenopathy may develop in HIV before the patient fulfils the criteria of AIDS. As the disease progress, there is atrophy of the lymph nodes. Less likely is pulmonary tuberculosis which can also cause any abnormality on CXR, and involve peripheral lymph nodes. The others are unlikely to cause lymphadenopathy.

31- Which of the following is true of Spontaneous bacterial peritonitis?

- 1) A survival rate of over 50% is expected at one year [0]
- 2) Gentamicin is the treatment of choice [0]
- 3) is characteristically caused by aerobic bacteria. [100]
- 4) is diagnosed by culture of ascitic fluid. [0]
- 5) is due to intestinal perforation [0]

SBP is a frequent complication of the ascites of cirrhosis. It is diagnosed by ascitic fluid examination which reveals a PMN count of >250/ml. SBP has poor prognostic significance with a one year survival after a diagnosis of between 30-50%. It is, as the name suggests a spontaneous event that is not a consequence of intestinal perforation. It is speculated that the infective organism may leak into the ascitic fluid via the blood or from intestinal overgrowth. Organisms should be cultured by directly collecting into blood culture bottles. It is typically caused by aerobic Gram negative bacteria. Hence Cefotaxime is regarded as the drug of choice for treatment.

32- You are an occupational health physician and have been asked by an anxious employee about contraindications to pertussis immunisation. Which of the following is a contraindication?

- 1) Eczema [0]
- 2) Cow's milk protein intolerance. [0]
- 3) Fever to 39.5°C following the first dose. [100]
- 4) Redness of >2.5cm at the injection site after the first dose. [0]
- 5) Hydrocephalus [0]

True contraindications to pertussis immunisation include:

Acute illness - until recovered.

Previous reaction to pertussis:

Local: an extensive area of redness and swelling which becomes indurated, involving most of the anterolateral surface of the thigh or a major part of the circumference of the upper arm.

General: fever equal to or more than 39.5°C within 48 hours of vaccine, anaphylaxis, bronchospasm, laryngeal oedema, generalised collapse, prolonged

hyporesponsiveness, prolonged inconsolable or high-pitched screaming of >4 hours, convulsions or encephalopathy occurring within 72 hours.

A personal family history of allergy is not a contraindication, nor are stable neurological conditions such as cerebral palsy or spina bifida. In patients who have had a previous reaction, immunisations should be completed with DT vaccine, and acellular vaccine considered.

33- The antibiotic combination Quinipristin and Dalfopristin are

- 1) effective against resistant mycobacterium TB. [0]
- 2) indicated in subjects with chronic renal impairment. [0]
- 3) particularly effective in the treatment of pseudomonas infection in Cystic fibrosis. [0]
- 4) administered orally. [0]
- 5) Effective against multi-resistant Staph Aureus [100]

Quinipristin and Dalfopristin are a synergistic combination of a streptogramin A and B respectively. They are effective against Gram positive aerobes and are particularly useful against resistant strep pneumoniae and Staph Aureus. They can only be administered via a central line.

34- Which of the following is the commonest cause of traveller's diarrhoea?

- 1) E. Coli [100]
- 2) Entamoeba Histolytica [0]
- 3) Giardia Lamblia [0]
- 4) Shigella Flexneri [0]
- 5) Yersinia enterocolitica [0]

Enterotoxigenic E Coli is the commonest cause of travellers diarrhoea and is usually a self limiting condition. Usually no treatment nor investigation is required for this brief diarrhoeal illness. Other causes that may be associated with prolonged diarrhoea include Giardia and amoebiasis. Chronic diarrhoea merits investigation.

35- Which of the following is true concerning Whooping cough (pertussis)?

- 1) is a greater threat to children during the second 6 months of life, after maternal antibody has declined, than during the first 6 months [0]
- 2) may lead to hemiplegia [100]
- 3) is characteristically associated with a polymorph leucocytosis [0]
- 4) is associated with convulsions less frequently than is the case with other febrile conditions [0]
- 5) rapidly resolves with antibiotic treatment [0]

Whooping cough (pertussis) is caused by the bacterium Bordetella pertussis. B. pertussis is a very small Gram-negative aerobic coccobacillus that appears singly or in pairs. Infection is characterised by paroxysms of coughing. Lymphocytosis is typically found. Hemiplegia is a recognised effect of severe whooping cough. The pertussis vaccine is estimated to be 63% to 94% effective in the DPT shot.

36- A 30 year old renal transplant recipient presented with non-Hodgkin's lymphoma.

Which virus is most likely to be of aetiological significance?

- 1) Adenovirus [0]
- 2) Cytomegalovirus [0]
- 3) Epstein Barr virus [100]
- 4) Herpes simplex type 1 [0]
- 5) Varicella-zoster [0]

EBV-associated lymphoproliferative disease may occur in individuals with inherited or acquired immunodeficiency syndromes. Approximately 1% of renal transplant recipients develop post-transplant lymphoproliferative disease (PTLD) in the first year following their transplant.

37- A 49-year-old man with a long history of alcoholism presents with cough, haemoptysis and pleuritic chest pain. He has had night sweats and 10 kg weight loss in the last three months. On chest X-ray there is a subtle nodular pattern throughout the lung.

He underwent a transbronchial biopsy which showed multinucleated giant cells, epithelioid cells and necrotic debris.

Which of the following is the most likely diagnosis?

- 1) Aspergillosis [0]
- 2) Pneumocystis carinii pneumonia [0]
- 3) Small cell carcinoma [0]
- 4) Squamous cell carcinoma [0]
- 5) Tuberculosis [100]

38- Which of the following concerning IgG is correct?

- 1) It has a molecular weight of 50,000 kd. [0]
- 2) It is monovalent. [0]
- 3) It comprises the majority of circulating antibody in serum. [100]
- 4) It differs from other isotypes in not being able to cross the placental barrier. [0]
- 5) It is the major antibody produced during the primary response. [0]

a) Each light chain has a MW of 25,000 and each H chain a MW of 50,000. Therefore, since the whole molecule consists of 2 L and 2 H chains, the MW is 150,000 kd. b) It exists as a monomer with 2 Fab portions, each of which can interact with an antigenic determinant. Therefore it is divalent. c) Normal range 8-19 g/l. Next is IgA, 1-5 g/l, followed by IgM 0.5- 2 g/l. d) It is in fact the only antibody capable of crossing the placental barrier, which it does through gaining attachment via its Fc portion. e) It is the major antibody produced in the secondary immune response. IgM is the major antibody produced during the primary response. (c) Dr Alan Cann

39- Four members of a football team develop diarrhoea due to Salmonella enteritidis. Eating which food was the most likely source of the infection?

- 1) chicken at a fast food outlet 20 hours earlier [100]
- 2) fried rice at a takeaway 4 hours earlier [0]
- 3) raw eggs in milk 6 hours earlier [0]

- 4) raw oysters at a hotel 24 hours earlier [0]
- 5) soft cheeses 48 hours earlier [0]

The incubation time for Salmonella enteritidis is 12 - 48 hours and the likely sources are poultry and eggs. Raw oysters are associated with infections such as the Norwalk agent.

40- A 68-year-old man has been very ill for months following the onset of chronic liver disease with hepatitis C infection. He experiences a sudden loss of consciousness and then exhibits paraplegia on the right. A cerebral angiogram reveals lack of perfusion in the left middle cerebral artery distribution. The most likely cardiac lesion to be associated with this finding is?

- 1) Acute rheumatic fever [0]
- 2) Left atrial myxoma [0]
- 3) Libman-Sacks endocarditis [0]
- 4) Non-bacterial thrombotic endocarditis [100]
- 5) Paradoxical thromboembolus [0]

Marantic endocarditis has platelet-fibrin thrombi that are prone to embolize. This form of non-infective endocarditis can be seen in persons who are very debilitated or who have a hypercoagulable state.

41- Which of the following is a feature of Vancomycin-resistant enterococci?

- 1) cause resistant infective diarrhoea [0]
- 2) produce an enzyme that inactivates vancomycin [0]
- 3) may be found in healthy community volunteers not recently hospitalized [100]
- 4) high dose ampicillin is the treatment of choice [0]
- 5) are commonly vancomycin-dependent [0]

a-When they cause clinical problems they are usually UTI, bacteraemia, wound infections, neonatal infections, endocarditis etc. b-They alter peptidoglycan precursors used to build cell walls. Vancomycin binds to D-ala-D-ala but the resistant enterococci have D-ala-D-lac or D-ala terminating precursors. They acquire genes that produce enzymes to change the precursors. c-2% in UK general practice, 28% in Belgium. Community reservoir in meat, poultry and ?cheese. d-only if the MIC of ampicillin is not too high. Anecdotal evidence exists for its use in E. faecalis endocarditis. (20g / day) e-Some strains only. An explanation for this curious process is that there is an inability to produce cell walls because the vancomycin-sensitive precursor genes have been turned off and the resistant ones only appear in the presence of vancomycin. (Source: Am J Med 1997;102:284-293)

42- An 85 year old patient from an elderly care home, experiences sudden onset of dyspnea and palpitations. A pulmonary ventilation-perfusion scan is performed and indicates a high probability for a perfusion defect involving a pulmonary arterial branch.

Which of the following findings or conditions is the one that is the most important factor favouring development of her complaint?

- 1) A neutrophilia [0]
- 2) An increased platelet count [100]
- 3) Cirrhosis of the liver [0]
- 4) Generalized atherosclerosis [0]
- 5) Poor nutrition [0]

This would lead to a prothrombotic state, increasing the risk of pulmonary embolism. Cirrhosis, and possibly poor nutrition, would lead to decreased production of coagulation factors thus prolonging the INR. A neutrophilia would suggest infection leading to ventilation defect, and not a perfusion defect. Atherosclerosis would predispose to arterial thrombo-embolus.

43- A young man from India presents with fever of 4 months duration and splenomegaly. What is the most likely diagnosis?

- 1) Coccidiomycosis [0]
- 2) Giardiasis [0]
- 3) Tropical sprue [100]
- 4) Typhoid [0]
- 5) Visceral leishmaniasis [100]

Visceral leishmaniasis (Kala-azar) is an endemic disease in several regions of India and sub-Saharan Africa. It is caused by the parasite *Leishmania donovani donovani* and spread by *Phlebotomus* sand-flies. Leishmaniasis is common in immune-suppressed patients, particularly those infected with HIV. There has recently been a substantial increase of cases in the Mediterranean region. It has been estimated that 15% of HIV positive drug users in Spain are infected with *Leishmania donovani infantum*. Giardiasis and tropical sprue present with gastrointestinal symptoms and malabsorption. Typhoid is an acute illness. Coccidiomycosis is largely confined to the Americas. Most patients present with pulmonary symptoms although disseminated disease can occur particularly in the immune-suppressed.

44- A 35-year-old man returned from a two-week holiday complaining of pain in the loins and painful swollen knees. On examination he was afebrile and had significant bilateral knee effusions. Mild penile erythema was also noted. Laboratory investigations showed.

Hb 15.6 g/dL
WBC 16.2 x 10⁹/l
Neutrophils 14.1 x 10⁹/l
ESR 65 mm/h
Rheumatoid factor 10 IU/L
Urinalysis No cells, casts or bacteria seen

What is the most likely diagnosis?

- 1) Arthritis due to *Neisseria gonorrhoeae* infection [100]
- 2) Lymphogranuloma venereum [0]

- 3) Reactive arthritis [0]
- 4) Reitter's syndrome [0]
- 5) Rheumatoid arthritis [0]

Gonococcal arthritis typically affects the knees and is the likeliest diagnosis in this scenario.

45- A 40-year-old man has had decreased mentation with confusion as well as increasing incoordination and loss of movement in his right arm over the past 6 weeks. An MRI scan shows 0.5 to 1.5 cm lesions in cerebral hemispheres in white matter and at the grey-white junction that suggest demyelination. A stereotatic biopsy is performed, and immunohistochemical staining of the tissue reveals JC papovavirus in oligodendrocytes. Which of the following laboratory test findings is most likely to be associated with these findings?

- 1) CD4 lymphocyte count of 90/microliter [100]
- 2) Haemoglobin A1c of 9.8% [0]
- 3) HDL cholesterol of 0.7 mmol/L [0]
- 4) Oligoclonal bands in CSF [0]
- 5) Serum sodium of 110 mmol/L [0]

The findings are those of progressive multifocal leukoencephalopathy (PML), which is a condition that can develop in immunocompromised patients, such as those with AIDS. PML is associated with papova (JC) virus infection.

46- Which one of the following statements concerning T-lymphocytes is correct?

- 1) Are the primary host response in bacterial infection [0]
- 2) Compose the majority of lymphocytes in plasma [100]
- 3) Are infected by Epstein-Barr virus in infectious mononucleosis [0]
- 4) produce IgG [0]
- 5) T cell lymphoma has a better prognosis [0]

The primary host response to bacterial infections is dependent on mononuclear phagocytes and neutrophils. T-lymphocytes are involved in cell-mediated acquired immune responses, whereas B-lymphocytes are involved in humoral immunity and produce immunoglobulins. T lymphocytes compose the majority of circulating lymphocytes in plasma. Epstein-Barr virus infects B-lymphocytes and squamous epithelial cells of the oropharynx. The virus can transform B cells and epithelial cells to produce Burkitt's lymphoma, a subset of Hodgkin's lymphoma, nasopharyngeal carcinoma and oral hairy leukoplakia. T cell lymphoma makes up about 10-20% of non-Hodgkin's lymphomas and has a worse prognosis than B cell lymphoma.

47- You are considering starting a patient on Griseofulvin. Which of the following statements concerning its pharmacology is true?

- 1) It is active against *Candida albicans*. [0]
- 2) It is active against *aspergillus*. [0]
- 3) It should not be used in renal failure. [0]
- 4) It used for a maximum of 2 weeks. [0]

5) It is associated with drug-induced Stevens Johnson syndrome. [100]

For griseofulvin and Steven-Johnson syndrome read J Emerg Med 1984;2:129-135.
Many other drugs are implicated in causing Steven-Johnson syndrome.

Griseofulvin is not active against *Candida albicans*. It is active against trichophytons (tinea) and other dermatophytes. It is metabolised in the liver (note also it's an enzyme inducer). Only 0.1-0.2% excreted in urine. Treatment with griseofulvin is often needed for a long period, sometimes years, depending on the rate of nail growth.

48- A 14 year old boy presents with fever. Which of the following might contribute to a diagnosis of rheumatic fever?

- 1) The finding of target lesions on the hands. [0]
- 2) The finding of tender nodules in the fingertips. [0]
- 3) A prolonged PR interval on ECG. [100]
- 4) A CRP of 10. [0]
- 5) Positive Romberg's sign. [0]

The modified Jones Criteria include: Finding of preceeding streptococcal infection (recent scarlett fever, raised ASOT or other streptococcal antibodies, positive throat swab for Group A Strep). Plus:

a) MAJOR CRITERIA:

Carditis

Polyarthritis

Chorea

Subcutaneous nodules

Erythema marginatum.

b) MINOR CRITERIA:

Fever

Arthralgia

Previous history of rheumatic fever

Elevated acute phase reactions

Prolonged PR interval.

Erythema marginatum involves red circular lesions which gradually enlarge with central clearing. Sydenham's chorea consists of choreoathetoid movements with increased clumsiness, e.g. deteriorating handwriting. This is often associated with emotional lability. Target lesions suggest erythema multiforme. A CRP of 10 is not elevated much beyond the normal range. Erythema marginatum initially manifests as non-specific pink macules seen over the trunk, with later blanching in the middle of the lesions and sometimes fusing of the borders resulting in a serpiginous (serpent-like) looking lesion. The rash is worsened with heat, but is characteristically evanescent. It does not itch, and can be mistaken for the rash of Lyme disease. Subcutaneous nodules are pea-sized, firm and non-tender. There is no associated inflammation and they are characteristically seen on the extensor surfaces of joints such as knees and elbows and also over the spine.

49- A 75 year old man has a history of Chronic Lymphocytic Leukaemia. He has had treatment with several courses of chemotherapy and has now been admitted to hospital with pneumonia. His past medical history revealed that he had suffered several previous upper respiratory tract infections over the previous six months.

Which of the following components of his immune system is likely to be deficient?

- 1) Complement [0]
- 2) Immunoglobulin G [100]
- 3) Macrophages [0]
- 4) Mast cells [0]
- 5) T lymphocytes [0]

CLL is commonly complicated by panhypogammaglobulinaemia. Although IV immunoglobulin prevents recurrent infections it does not prolong survival.

50- Which of the following is true of the T cell response to antigen?

- 1) A process of affinity maturation of the T cell receptor occurs. [0]
- 2) Intact antigen is presented in association with self MHC molecules. [0]
- 3) Co-operation with other cell types is required for T cell recognition of antigen. [100]
- 4) gamma/delta + T cells respond to antigen presented in association with MHC class II molecules. [0]
- 5) Interactions of the TcR with an appropriate Ag/MHC complex activates a resting T cell. [0]

a) Affinity maturation in an ongoing immune response is a feature of the antibody response. There is no evidence that a similar process occurs in the T cell response. b) MHC molecules present short antigen-derived peptides, not the intact antigen. c) T cells recognise antigen only when presented by (self) MHC molecules on an antigen presenting cell. d) MHC class II molecules present antigen to CD4+, alpha/beta+ T cells. It is still not clear how gamma/delta+ T cells recognise antigen, however most gamma/delta+ T cells do not appear to be restricted by (self) MHC molecules. e) Additional 'costimulatory' signals are required to activate a resting T cell. Interaction of the TcR of a resting T cell with an appropriate Ag/MHC complex in the absence of costimulatory signals may lead to the induction of anergy. (c) Dr Alan Cann

51- A 40-year-old man presented with pityriasis versicolor.

What is the most appropriate treatment?

- 1) methotrexate [0]
- 2) oral terbinafine [0]
- 3) psoralen with ultraviolet light (PUVA) therapy [0]
- 4) topical selenium sulphide [100]
- 5) phototherapy with ultraviolet light (UVB) [0]

Pityriasis versicolor (also called tinea versicolor) is a skin lesion caused by a fungus called *Malassezia furfur*. The treatment is topical selenium sulphide. Oral Itraconazole is also effective.

Your last attempt at this question scored 0 (

52- Which of the following suggests a diagnosis of molluscum contagiosum rather than chickenpox?

- 1) Presence of macules and papules [0]
- 2) Absence of erythema surrounding lesions [100]
- 3) Lesions disappearing within a month [0]
- 4) Presence of pruritis [0]
- 5) Positive contact history [0]

Molluscum contagiosum is caused by a DNA pox virus. The lesions are small, skin coloured papules with central umbilication. There is little surrounding inflammation and they may be spread following scratching to other sites. Chickenpox lesions in the early stages may be mistaken for molluscum. However, the presence of associated macules and later vesicles and pustules help to differentiate them. These lesions also affect the mucous membranes, and usually disappear within a few weeks, while molluscum can persist for up to a year.

53- Ten individuals are admitted to casualty with profuse vomiting after attending a retirement dinner in a Chinese restaurant. They all ate at roughly 7 pm and became ill at roughly midnight. Nine ate a mixture of dishes except one female who ate vegetarian dishes with her rice. What is the most likely infective organism?

- 1) Salmonella enteritidis [0]
- 2) Staphylococcus aureus [0]
- 3) E. Coli [0]
- 4) Clostridium perfringens [0]
- 5) Bacillus cereus [100]

This is a typical case of Bacillus cereus, with profuse vomiting which occurs approx 1-5 hrs after eating. In this case it is likely that the rice itself had been infected. Another possibility is Staph. aureus although this is less likely.

54- A 27 year old man presents with fever, urethritis and arthralgia. He is found to have a swollen ankle with a pustular rash on the dorsal aspect of his foot.

What is the most likely diagnosis?

- 1) Gonococcal sepsis [100]
- 2) Lyme disease [0]
- 3) Reiter's syndrome [0]
- 4) Staphylococcal arthritis [0]
- 5) Tuberculous arthritis [0]

The most likely cause for this acute presentation is gonococcal septicaemia - with a pustular rash on the dorsum of his foot, fever, urethritis and oligoarthritis. Reiter's is

associated with an acute infection – urethritis/diarrhoea and later the development of an arthritis.

55- A 63 year old female presents with a one day history of confusion with headaches. On examination she is confused, with a Glasgow Coma Scale of 13 and a temperature of 39.5. She has nuchal rigidity and photophobia. CSF examination reveals a glucose of 0.5 mmol/l, a white cell count of 2500 per mm and Gram positive Cocci in pairs. Which of the following is correct?

- 1) The most likely infective organism is Staphylococcus Aureus [0]
- 2) The organism is likely to be penicillin resistant. [0]
- 3) Rifampicin should be given to close contacts. [0]
- 4) Nerve deafness would be a common complication in this case. [100]
- 5) A characteristic rash would be expected. [0]

This patient has pneumococcal meningitis, caused by the Gram positive coccus Strep Pneumonia. This is the commonest cause of bacterial meningitis and is associated with the highest mortality (20%) and highest morbidity, such as deafness which may occur in 50%. Contacts do not require treatment and there is no rash associated with pneumococcal meningitis.

56- A young teenager presents with fever and headache. He has received oral Amoxycillin for 3 days. Which of the following CSF findings would exclude a partially treated meningitis?

- 1) Negative gram stain [0]
- 2) A CSF glucose of 45% of blood glucose [0]
- 3) A white cell count of 50 [100]
- 4) A negative CSF culture [0]
- 5) Negative Kernig's Sign [0]

The assessment of children with suspected bacterial meningitis who have already received antibiotic therapy is a diagnostic conundrum. This applies to about 25-50% of children, so it is an important problem. Partial treatment may reduce the incidence of positive CSF gram stains to <60%, and it also reduces the ability to grow the bacteria, particularly meningococcus. CSF glucose, protein, neutrophils and bacterial antigen testing or PCR should be completely unaffected.

57- Which of the following statements is characteristic of acute hepatitis B infection?

- 1) Most patients present with splenomegaly. [0]
- 2) It confers immunity to hepatitis A. [0]
- 3) It commonly presents with distal joint arthritis. [0]
- 4) There is increased infectivity in the presence of the e antigen. [100]
- 5) Pruritis is an important early symptom. [0]

Clinical features of hepatitis B are as follows:
Most are asymptomatic.

Symptoms: Lethargy, anorexia, arthralgia, rash (any type), papular acrodermatitis (Gianotti Crosti), polyarthritis, glomerulonephritis, aplastic anaemia. 25 % have jaundice.

Complications: · Acute fulminant hepatitis. · Chronic hepatitis. · Membranous glomerulonephritis. Hepatitis E antigen is present in the acute phase and indicates a highly infectious state. Pruritis is characteristic of chronic hepatitis.

58- Giardia lamblia infection

- 1) is often symptomatic [0]
- 2) is usually spread faecal-orally [0]
- 3) is eradicated by mebendazole [0]
- 4) causes steatorrhoea [100]
- 5) diagnosed by stool culture [0]

Usually acquired by drinking water containing Giardia cysts. Many individuals excreting cysts are asymptomatic and are thus carriers. Others have diarrhoea, steatorrhoea, abdominal pain and nausea. Diagnosed by stool microscopy - if negative, parasite found in duodenal aspirates or biopsy. Testing of serum antibodies against G lamblia trophozoites is not useful in diagnosing current infection. Eradicate with metronidazole (or quinacrine, tinidazole, ornidazole, furazolidone, paromomycin). Mebendazole is used in treating hookworm infections eg ascaris, whipworm and threadworm.

59- Which of the following statements is true of psittacosis (ornithosis):

- 1) It is only a risk from contact with psittacines (parrots), not other birds [0]
- 2) It usually causes many polymorphs to be present in the sputum [0]
- 3) It is more of a risk to children than to adults who are exposed to birds [0]
- 4) It does spread from person to person [100]
- 5) Infection responds rapidly to penicillin therapy [0]

Chlamydia psittaci is endemic in birds including psittacine birds, canaries, finches, pigeons and poultry. Pet owners, vets and zoo keepers are most at risk. Rare in children. Person-person transmission occurs especially in a hospital environment. Sputum Gram stain reveals a few leucocytes and no predominant bacteria. Few signs/few lab/xray findings. Positive serology with complement-fixing antibodies. treat with tetracycline.

60- Which of the following is true of Koplik's spots?

- 1) Are diagnostic of Measles [100]
- 2) Located opposite the incisor teeth. [0]
- 3) Only appear when fever is over 39°C [0]
- 4) They appear as red papules on the palmar surface of the hands [0]
- 5) Typically appear two days after the rash. [0]

Koplik's spots are small, irregular, bright red spots with blue-white centres, occurring on the inside of the cheek next to the premolars. Seen only in measles they are diagnostic. The spots usually occur briefly after the fever begins and a couple of days

before the generalized rash appears. Not infrequently, the spots disappear as the eruption develops.

61- Which of the following statement is true of infections with *Mycobacterium tuberculosis*:

- 1) non-sputum producing patients are non-infectious [100]
- 2) a positive tuberculin test indicates active disease [0]
- 3) lymph node positive disease requires longer treatment than pulmonary disease [0]
- 4) in pregnant women treatment should not be given until after delivery [0]
- 5) pyrazinamide has high activity against active extracellular organisms [0]

Only untreated smear positive pulmonary TB is likely to be infectious. Active disease may be indicated by grade III/IV response to tuberculin. 80% of individuals with history of BCG vaccination have grade I/II response. All forms of pulmonary TB may be treated equally except tuberculous pleural effusion which may require drainage (with large effusions causing breathlessness) and adjunct corticosteroids to delay reaccumulation. Length of treatment for other forms are bone TB 9 months, meningitis 1 year, drug resistance 2 years. Streptomycin has high activity against extracellular organisms whilst pyrazinamide have high activity against intracellular organisms.

62- Which of the following statements concerning zoonotic diseases is true?

- 1) Brucellosis is characterised by neutrophil leucocytosis. [0]
- 2) Brucellosis is a recognised cause of spondylitis. [100]
- 3) Toxoplasmosis causes visceral larva migrans. [0]
- 4) Toxoplasmosis causes posterior uveitis. [0]
- 5) Serological evidence of toxoplasmosis is rare in adults. [0]

Brucellosis is a zoonosis, spreading from infected animals particularly cattle. There are 4 species, *melitensis*, *abortus*, *suis*, and *canis*. Pasteurisation of milk has decreased the incidence in the UK dramatically. *Brucella* are gram negative bacilli which are fastidious. There is usually a history of exposure, and the symptoms are rather non-specific with fever, malaise, arthralgia and depression. 35% have hepatosplenomegaly. Leukopenia is common, and 75% have a positive blood culture (90% of bone marrow cultures will be positive). *Toxoplasma* is most frequent in farming communities where contact occurs with cats, and patients eat raw meat. Clinical manifestations include: focal choroidoretinitis, optic atrophy, retinal detachment, cataract and glaucoma.

63- A 42-year-old man with advanced HIV disease presented with a tonic-clonic seizure. He had been diagnosed with HIV 10 years previously, but had elected not to take antiretroviral therapy. A CT scan of his brain showed a 2 cm ring-enhancing lesion in the right parietal lobe.

What is the probable causative agent?

- 1) *Cryptococcus neoformans* [0]
- 2) *Mycobacterium avium* intracellulare [0]
- 3) *Mycobacterium tuberculosis* [0]

- 4) *Pneumocystis carinii* [0]
- 5) *Toxoplasma gondii* [100]

This is a typical presentation with AIDS-related cerebral toxoplasmosis. The differential diagnosis of ring-enhancing lesions on CT in a patient with AIDS include (1) Cerebral toxoplasmosis (2) abscesses (3) metastases (4) atypical CNS lymphoma. *Cryptococcus* typically causes a meningitis. CNS infections with the remaining organisms are rare in AIDS.

- 64- In herpes simplex encephalitis which of the following statements is correct?
- 1) brain MRI is characteristically normal [0]
 - 2) temporal lobe involvement is common [100]
 - 3) fits are uncommon [0]
 - 4) cold sores or genital herpes are usually present [0]
 - 5) viral identification by PCR on cerebrospinal fluid is non-specific [0]

MRI brain normally shows changes in the temporal lobes. Presenting features include fever, headache, vomiting, reduced consciousness and seizures. There may be dysphasia, hallucinations and peculiar behaviour. There are usually no skin manifestations of herpes simplex infections. The virus is rarely isolated from CSF but may be detected by PMR.

65- A 52-year-old woman was admitted with malaise and leg weakness. Her illness started with a sore throat while travelling in Eastern Europe. On examination she was febrile (39.1°C) with several areas of exudates on her pharynx and extensive cervical lymphadenopathy. There was weakness of the legs with absent tendon reflexes.

What is the most likely diagnosis?

- 1) Acute myeloid leukaemia [0]
- 2) Cytomegalovirus infection [0]
- 3) Diphtheria [100]
- 4) Glandular fever [0]
- 5) Streptococcal tonsillitis [0]

This history of severe exudative pharyngitis in a person who has recently travelled to eastern Europe is highly suggestive of diphtheria. The disease, caused by *Corynebacterium diphtheriae*, causes a severe pharyngitis with extensive soft tissue swelling and lymphadenitis that produces a characteristic 'bull neck' appearance. Exotoxins produced by the organism may cause myocarditis or neurological defects. The degree of neurological toxicity varies, but may be severe, causing cranial neuropathies, predominantly motor peripheral neuropathy (occasionally sensory neuropathy). An epidemic of diphtheria began in Russia in the early 1990s and remains a significant public health problem in Russia and in the former Soviet states.

- 66- Which of the following concerning *Corynebacterium diphtheriae* is correct?
- 1) Causes skin infection [100]

- 2) Infection is often complicated by myocardial fibrosis after recovery from severe infection [0]
- 3) Is most unlikely to cause infection in an individual with a positive Schick test [0]
- 4) Mitis strain is generally more virulent than the intermedius strain [0]
- 5) Toxin is better absorbed through the nasal than the pharyngeal mucosa [0]

Corynebacterium diphtheriae is a gram positive, non-spore forming, pleomorphic bacteria that is also a facultative anaerobe. *Corynebacterium diphtheriae* causes Diphtheria. Typically diphtheria attacks the respiratory system, but may also affect the skin, conjunctiva and external genitalia. Signs and symptoms include sore throat, fever, and swelling of lymph nodes in the neck and general malaise. As the disease progresses Diphtheria toxin is secreted. This destroys the membrane surface of the affected areas and replaces them with a grayish tough leathery "Pseudomembrane" made of dead tissue, leukocytes and bacteria. Toxin could also affect the heart, nerves and other organs in the body causing Heart failure, nerve damage or suffocation. Toxin can be neutralized by the immune serum produced by the host cells. Diphtheria is transmitted from person to person. Human beings are the main reservoir.

67- A 43-year-old woman develops a progressive, ascending motor weakness over several days. She is hospitalized and requires intubation with mechanical ventilation. She is afebrile. A lumbar puncture is performed with normal opening pressure and yields clear, colorless CSF with normal glucose, increased protein, and cell count of 5/microliter, all lymphocytes. She gradually recovers over the next month. Which of the following conditions most likely preceded the onset of her illness?

- 1) Ketoacidosis [0]
- 2) *Staphylococcus aureus* septicemia [0]
- 3) Systemic lupus erythematosus [0]
- 4) Viral pneumonia [100]
- 5) Vitamin B12 deficiency [0]

She has Guillain-Barre syndrome often preceded by an episode of infection such as viral (CMV) or bacterial (*Campylobacter*).

68- Which of the following is true of anthrax?

- 1) It is caused by an aerobic, gram negative rod. [0]
- 2) It causes trivial disease in the host herbivore population. [0]
- 3) Gastrointestinal anthrax is the most usual form of disease in humans. [0]
- 4) Eschars are usually painless. [100]
- 5) Sputum culture has a high yield in inhalational anthrax. [0]

Anthrax will be a particularly topical question in the exam. It is caused by the gram positive, aerobic, non-motile *Bacillus Anthracis*. It produces serious disease in the herbivore host and carnivores acquire disease from either consuming the spores from the dead animal or by contact. In humans, cutaneous disease is most common and a painless, black, indurated eschar frequently forms. Mortality from cutaneous disease is 20% if untreated whereas inhalational anthrax may have a mortality of 90% if

untreated. Inhalational anthrax is associated with a poor yield from sputum culture with the greatest yield from blood culture.

69- Which of the following forms of encephalitis is caused by a neuroimmunological response?

- 1) Herpes simplex [0]
- 2) Measles [100]
- 3) HIV infection [0]
- 4) Enteroviruses [0]
- 5) Cytomegalovirus [0]

Encephalitis may be caused by:

Direct invasion by a neurotoxic virus (encephalitis).

Post-infectious encephalopathy: delayed brain swelling because of an immunological response to the antigen.

Slow virus infection, e.g. HIV or SSPE.

Direct infection is most commonly caused by enteroviruses, HSV 1 and 2, varicella, CMV, and EBV. It is also occasionally caused by respiratory viruses, HHV6, rubella or mumps. A post-infectious illness may also be caused by measles or varicella zoster (cerebellar ataxia).

70- A 40-year-old man with a long history of alcohol abuse is admitted with a subacute illness, comprising headache, fever, meningism and ataxia. MRI brain showed patchy high signal abnormality of the brain stem. CSF analysis showed polymorphonuclear pleocytosis and low glucose. He had failed to improve after 3 days of intravenous cefotaxime treatment. The most likely diagnosis of the meningitis is:

- 1) Mycobacterium tuberculosis [0]
- 2) Cryptococcus neoformans [0]
- 3) Nocardia asteroides [0]
- 4) Staphylococcus aureus [0]
- 5) Listeria monocytogenes [100]

Listeria meningitis should always be considered in patients with meningitis associated with brain stem involvement. The treatment of choice is gentamycin and ampicillin. TB and fungal meningitis usually showed a lymphocytic pleocytosis.

71- Which of the following is correct regarding human varicella zoster immunoglobulin (VZIG)?

- 1) Is used to treat severe chicken pox infection [0]
- 2) Is recommended for all patients with eczema exposed to chickenpox. [0]
- 3) Is invariably protective against severe varicella. [0]
- 4) Should be given to a 14 day old whose mother has developed chickenpox [0]
- 5) Should be given to a 20 week pregnant non-immune female who has been exposed to a case of chicken pox. [100]

Varicella has a secondary infection rate in household contacts of 90%. It is commonest in spring time, and the incubation period is 14-21 days. It shares the

herpes virus family properties of latency and reactivation (zoster). Risks to the fetus and neonate relate to the time of infection:

Less than 20 weeks pregnancy: congenital varicella (limb hypoplasia, microcephaly, cataracts, growth retardation, skin scarring). High mortality.

Second to third trimester: herpes zoster in an otherwise healthy infant.

Minus 7 days to plus 7 days after delivery: severe and even fatal disease (30% mortality). Although a live attenuated vaccine is available, it is not licensed for use in the UK.

Varicella zoster immunoglobulin is prepared from pooled plasma of UK blood donors with a history of recent chickenpox or herpes zoster. Being an immunoglobulin, it is a protein concentrate, and should be stored between 2 and 8°C. Donors are screened for HIV, hepatitis B and hepatitis C. VZIG prophylaxis is recommended for patients who fulfil all the following criteria:

A clinical condition that increases the risk of severe varicella, (e.g. immunosuppression, neonates, pregnant women).

No antibodies to varicella zoster.

Significant exposure to chickenpox or herpes.

Severe or fatal varicella can occur despite VZIG prophylaxis. Active immunisation should therefore be used for susceptible immunosuppressed patients at long term risk. Clinical chickenpox occurs in 50% of those who receive VZIG prophylaxis, and 10% more will be affected sub-clinically.

72- Which of the following is a contraindication to immunisation?

- 1) Infantile eczema requiring topical steroids. [0]
- 2) Oral poliomyelitis vaccine to a child on oral steroids. [100]
- 3) A history of prolonged jaundice. [0]
- 4) A child with congenital adrenal hyperplasia on oral cortisone. [0]
- 5) A child with cerebral palsy. [0]

Common misconceptions regarding immunisations include:

A family history of adverse reaction, or a previous history of pertussis, measles, rubella or mumps infection.

Prematurity or low birth weight.

Stable neurological conditions such as cerebral palsy or Down's Syndrome.

Asthma, eczema, hayfever or snuffles.

Contact with an infectious disease, or treatment with antibiotics or topical steroids.

Pregnant mother or a mother who is breast feeding.

Prolonged jaundice.

Patients on replacement corticosteroids.

Oral polio vaccine should not be given to immunosuppressed children, their siblings or household contacts. In children with HIV, there is little evidence that they themselves will have problems, but excretion may be prolonged, and this may give rise to an increased risk of infection of HIV positive household contacts.

73- Which of the following statements is correct of hepatitis C virus infection?

- 1) Cell cultures of virus are routinely used to assess response to drug therapy [0]
- 2) High antibody titres are an indication for therapy [0]
- 3) Less than 5% of cases lead to chronic infection [0]

- 4) More likely to be transmitted by the sexual route than hepatitis B virus [0]
5) Treatment with ribavirin and interferon alpha is more effective than interferon alpha alone [100]

In hepatitis C infection the criteria for treatment are abnormal liver function tests and detectable hepatitis C RNA in plasma, with evidence of moderate inflammation on liver biopsy. Response to therapy is determined by normalisation of hepatic transaminases and undetectability of hepatitis C RNA in plasma. Hepatitis C is generally transmitted by inoculation or vertically from mother-to-child. In contrast to hepatitis B, sexual transmission is uncommon. Around 85% of acute hepatitis C infections lead to chronic infection. Treatment with interferon alpha alone has around a 10-15% success rate in achieving long-term undetectability of plasma hepatitis C RNA. Combination treatment with ribavirin and interferon alpha has been found to have approximately a 45% success rate.

74- In the diarrhoea associated with cholera toxin, there is activation of which of the following enzyme systems?

- 1) Adenylate cyclase. [100]
2) ATP. [0]
3) Guanylate cyclase. [0]
4) Na-glucose co-transporter. [0]
5) Na⁺/K⁺ ATPase pump. [0]

Cholera toxin has two parts, A and B. B binds while A activates G protein, which activates adenylate cyclase. Elevated CAMP results in unrestricted chloride secretion from villous crypts.

75- Regarding diphtheria which of the following statements is correct?

- 1) It is predominantly spread from cutaneous lesions. [0]
2) It is characterised by an inflammatory exudate forming a greyish membrane on the buccal mucosa. [0]
3) It produces a toxin which affects the myocardium, nervous and adrenal tissues. [100]
4) 3 doses of toxoid provides 75% protection. [0]
5) About 50 cases per year are seen in the UK. [0]

Diphtheria is spread by droplets, through contact with soiled articles (fomites), and, in areas of poor hygiene, from cutaneous spread. The inflammatory exudate forms a greyish membrane on the tonsils and respiratory tract which may cause respiratory obstruction. Incubation is between 2 and 5 days, and patients may be infectious for 4 weeks. The toxin affects the myocardium, nervous and adrenal tissues. The immunisation has been tremendously successful, and most cases seen in the UK are imported from the Indian subcontinent or Africa. Recently, there has been a worrying epidemic of diphtheria in Russia and the newly independent states of the former Soviet Union. In 1995, 52,000 cases and 1,700 deaths were reported.

76- Which of the following is true of BCG vaccination?

- 1) is contraindicated in neonates [0]
- 2) is a killed polysaccharide antigen vaccine [0]
- 3) should be given to all children who have a strongly positive tuberculin test [0]
- 4) is presently routinely offered in the UK at age 16 years [0]
- 5) Provides protection against leprosy [100]

a - BCG vaccine may given to newborns at high risk of exposure. b - The BCG vaccine is an attenuated strain - it provides approximately 70% protection. c - It should NOT be given to these children. A low reactivity Heaf test (grade 0 - 1) should be documented before administration. d- BCG is given at Comprehensive school entry (age 11 - 13). e - It has also found a use in stimulating the immune system for the treatment of some cancers.

77- Which of the following micro-organisms is generally sensitive to Benzylpenicillin?

- 1) Bordetella pertussis [0]
- 2) Cryptococcus neoformans [0]
- 3) Mycoplasma pneumoniae [0]
- 4) Streptococcus Pneumoniae [100]
- 5) Streptococcus Viridans [0]

Penicillin binds to specific penicillin-binding proteins (PBP's) in the cell wall, mainly of gram positive organisms. Penicillin resistance is usually due to production of altered PBPs or beta-lactamases which leave the ... Penicillin is mainly useful for Group A Strep., Group B Strep., meningococcal and pneumococcal infections, though and anthrax are also sensitive. Pneumococci with modified PBPs are an increasing problem.

78- A-30-year-old man developed a febrile illness three days after returning from a holiday in Thailand. He was admitted complaining of severe myalgia. On examination he was febrile (39°C) with a diffuse macular rash on the trunk. There was no lymphadenopathy. Investigations revealed:

Haemoglobin 15.1 g/dL (13.0-18.0)
 White cell count 7.5 x 10⁹/L (4-11)
 Platelet count 105 x 10⁹/L (150-400)
 Serum total bilirubin 18 µmol/L (1-22)
 Serum alanine aminotransferase 120 U/L (5-35)

What is the most likely diagnosis?

- 1) Acute HIV infection (seroconversion illness) [0]
- 2) Dengue fever [100]
- 3) Hepatitis E [0]
- 4) Secondary syphilis [0]
- 5) Typhoid [0]

The symptoms are most consistent with dengue fever. While acute retroviral syndrome (acute HIV) is associated with a widespread macular rash, it is also usually

associated with pharyngitis and generalised lymphadenopathy. Hepatitis E presents in a similar manner to hepatitis A, i.e. as an acute febrile illness with jaundice. The history is too acute for secondary syphilis, which is not typically associated with myalgia. Typhoid fever is usually a diarrhoeal illness associated with subtle 'rose spots' on the abdomen.

Dengue fever is caused by an arthropod-borne flavivirus. The disease has an incubation period of approximately 7 days, followed by headaches and retro-orbital pain. Symptoms evolve rapidly and severe musculoskeletal pain is a prominent feature, with a maculopapular rash.

79- Primary Pulmonary tuberculosis:

- 1) Leads to pleural effusion [0]
- 2) Is highly infective [0]
- 3) Commonly leads to military TB [0]
- 4) May be totally asymptomatic [100]
- 5) Usually produces cavitation [0]

Primary Pulmonary tuberculosis is often asymptomatic consisting of primary complex. Cavitation and pleural effusions are a manifestations of post primary TB.

80- A 54-year old woman was admitted with acute breathlessness. On examination she had a temperature of 37.9°C, a respiratory rate of 32 breaths per minute, a pulse of 120 beats per minute, a blood pressure of 100/60 mmHg, and a peak expiratory flow rate of 250 litres per minute. Auscultation of the heart and chest was normal. The Chest X-ray was normal and blood gases on air showed: pH 7.35 (7.36 - 7.44)

PaO₂ 6.0

kPa (11.3 - 12.6)

PaCO₂ 3.9

kPa (4.7 - 6.0)

Serum bicarbonate 20 mmol/l (20 - 28)

She was started on high flow oxygen. What is the most important next treatment?

- 1) amoxycillin intravenously [0]
- 2) aminophylline intravenously [0]
- 3) intravenous fluids [0]
- 4) low molecular weight heparin [0]
- 5) nebulised salbutamol [100]

This patient has features of a severe acute asthma attack with Type 1 respiratory failure with mixed acid-base disturbances. Respiratory alkalosis is the commonest acid-base abnormality in acute asthma, but lactic acidosis in peripheral tissues may cause mixed acid-base disturbances. The British Thoracic guidelines suggest immediate treatment with high flow oxygen, nebulised salbutamol and corticosteroids. If there had been life-threatening features present (peak flow <33% predicted or best, silent chest, feeble respiratory effort, bradycardia, hypotension, exhaustion, confusion or coma), then add nebulised ipratropium and iv aminophylline or salbutamol. Although PE can cause low PaO₂, and normal or reduced PaCO₂, spirometry is usually normal or mildly reduced. Hence PE is less likely in this case.

81- A 30-year-old intravenous drug abuser develops acute aortic regurgitation due to infective endocarditis. Which of the following is least likely to be found on clinical examination?

- 1) decreased cardiac output [0]
- 2) decrescendo diastolic murmur [0]
- 3) hypotension [0]
- 4) mitral valve pre-closure [0]
- 5) peripheral vasodilatation [100]

Findings that would be typical include increased cardiac output, increased pulse pressure, a decrescendo murmur and a low diastolic blood pressure. Vasoconstriction not dilatation is typically found.

82- Which of the following is correct regarding Herpes simplex encephalitis?

- 1) shows a peak incidence in the Autumn [0]
- 2) is associated with a polymorphonuclear pleocytosis in the CSF [0]
- 3) produces a diffuse, evenly distributed inflammation of cerebral tissues [0]
- 4) produces a typical EEG pattern with lateralised periodic discharges at 2 Hz [100]
- 5) should be treated with acyclovir as soon as the diagnosis is confirmed by urgent CSF viral antibody titres [0]

This EEG pattern is seen but not diagnostic. Winter is the peak incidence. A lymphocytosis is characteristic in the CSF. Temporal lobe location is typical not diffuse. Immediate treatment required on clinical suspicion - don't wait!

83- Herpes zoster infection :

- 1) Gamma Interferon is an effective treatment. [0]
- 2) produces latent infection within the anterior horn cells [0]
- 3) causes urinary incontinence [0]
- 4) causes congenital limb deformity [100]
- 5) associated pneumonitis is equally common in smokers and nonsmokers [0]

Herpes zoster is due to reactivation of the virus lying dormant in the cells of dorsal root ganglion. Autonomic involvement can cause urinary retention. Pregnancy increases risk of pneumonitis. Chicken pox in the first and second trimester can produce a syndrome of skin scarring, hypoplastic limbs, eye and CNS impairments. Pneumonitis is uncommon in children, with incidence of 0.3% in immunocompetent adults. The risk is higher in smokers. Antiviral treatment include acyclovir and vidabarine.

84- A 25 year old male homosexual is admitted with dyspnoea and weight loss of 2 months duration. He is diagnosed with Pneumocystis pneumoniae due to AIDS. Which of the following concerning Pneumocystis pneumonia is true?

- 1) May have an extra pulmonary presentation [100]
- 2) is always associated with X-ray changes [0]
- 3) is caused by a bacterium [0]
- 4) elevated serum antibodies to P. carinii helpful diagnostically [0]

5) is best treated with intravenous pentamidine [0]

a-Any HIV associated condition. b-5-15% have normal CXR (always is always false ... but not always!). c-A fungus. d-There is polyclonal B-cell activation in AIDS. e-intravenous cotrimoxazole. (Dr Shu Ho)

85- A 45-year-old man returned from a two-week trip in Zimbabwe. Fourteen days later he presented with fever, headaches and a widespread rash. On examination there was generalised lymphadenopathy and a widespread maculopapular rash.

What is the most likely diagnosis?

- 1) acute HIV infection [100]
- 2) schistosomiasis [0]
- 3) strongyloidiasis [0]
- 4) tick typhus [0]
- 5) typhoid fever [0]

It is essential to exclude acute HIV in this case. Acute retroviral syndrome is said to occur in 60-80% of patients between 2 and 12 weeks following exposure to HIV. Typical symptoms include fever, pharyngitis, lymphadenopathy and a widespread macular rash. The illness closely resembles infectious mononucleosis. During seroconversion it is likely that the HIV antibody test will be negative; the diagnosis is made by PCR of peripheral blood for HIV RNA; in acute HIV the viral load is very high.

"The time from exposure to onset of symptoms is usually 2-4 weeks, but the incubation may be as long as 10 months in rare cases (N Engl J Med 1998;339:33; N Engl J Med 1997;336:919). Typical symptoms in a review of 209 cases (J Infect Dis 1994;168:1490) included fever (96%), adenopathy (74%), pharyngitis (70%), rash" more ...

http://hopkins-aids.edu/publications/book/ch1_primary.html#primary

"This particular patient clearly exemplifies the classic presentation of acute primary infection" more ...

<http://hopkins-aids.edu/brazil/speakers/quinn2.html>

Kahn JO, Walker BD. Acute human immunodeficiency virus type 1 infection. N Engl J Med. 1998; 339(1):33-9. Review

86- A 50-year-old man presented to hospital feeling generally unwell for 3 days. He had returned from a business trip to Thailand six weeks previously and had taken mefloquine as prophylaxis against malaria. On examination he was afebrile, temperature 36.5°C, Pulse was 100/minute and regular, his BP was 85/60 mm Hg.

Investigations showed:

Hb 14.2 g/dL (13.0-18.0)
WBC 19.0 x 10⁹/L (4- 11)
Neutrophils 18.0 x10⁹/L (1.5-7.0)
AST 72 IU/L (1-31)
Alkaline phosphatase 255 (45-105)

What is the most likely diagnosis?

- 1) Acute HIV infection (seroconversion illness) [0]

- 2) Dengue fever [0]
- 3) Gram-negative bacteraemia [100]
- 4) Hepatitis B [0]
- 5) Mefloquine-induced hepatitis [0]

A difficult question. The neutrophilia essentially excludes most viral causes. The presentation is not typical of acute HIV (fever, pharyngitis, rash & lymphadenopathy). Mefloquine can cause abnormal LFTs, but is not common. Even though the patient is afebrile, the likeliest diagnosis is therefore Gram-negative bacteraemia.

87- A 70 year old woman developed herpes zoster ophthalmicus.

Which one of the following is most likely to be a complication of this condition?

- 1) Hyphaema [0]
- 2) Keratitis [100]
- 3) Keratoconus [0]
- 4) Posterior subcapsular cataract [0]
- 5) Scleromalacia [0]

Keratitis due to VZV may subsequently lead to iridocyclitis and secondary glaucoma.

88- Which is true regarding Eczema Herpeticum?

- 1) Is invariably fatal if untreated. [0]
- 2) Usually has an indolent onset. [0]
- 3) Only a single crop of vesicles usually appear. [0]
- 4) Is typically associated with a high fever for over a week. [100]
- 5) Is more severe in reactivation disease. [0]

Eczema herpeticum is the result of primary infection of eczematous skin with HSV. The severity varies from mild to fatal. There is usually an abrupt onset with crops appearing over 7-9 days. These may become coalesced. Typically, the child has a high fever for 700 days, and recurrent attacks can occur. Death can result from physiological disturbances (loss of fluid electrolytes and protein through the skin) or dissemination of the virus to brain and other organs or from secondary bacterial sepsis.

89- A 28 year old male presents with a four day history of profuse bloody diarrhoea after returning from a holiday in the Far East. Which of the following regarding his illness is true?

- 1) a negative amoebic fluorescent antibody test excludes a diagnosis of acute amoebic dysentery [100]
- 2) Cysts to *E. histolytica* in the stools confirms a diagnosis of acute amoebic dysentery [0]
- 3) cholera is a likely diagnosis [0]
- 4) Giardiasis is a likely diagnosis [0]
- 5) shigellosis is a likely diagnosis [100]

Shigellosis is a possible cause of profuse bloody diarrhoea as cholera and giardiasis are associated with watery diarrhoea. Trophozoites seen in acute amoebic dysentery, and the test is not 100% sensitive.

90- Which of the following infections is least likely to cause myocarditis?

- 1) Coxsackie virus [0]
- 2) Diphtheria [0]
- 3) Chagas Disease [0]
- 4) Syphilis [100]
- 5) Toxoplasmosis [0]

Quaternary syphilis involves the cardiovascular system commonly in form of ascending aortic aneurysm and aortic regurgitation. Diphtheria, coxsackie virus, Chagas disease and toxoplasmosis are all associated with myocarditis.

91- Chronic liver disease is NOT a complication of

- 1) Haemosiderosis [100]
- 2) Hepatitis C [0]
- 3) alpha1 antitrypsin deficiency [0]
- 4) cystic fibrosis [0]
- 5) haemochromatosis [0]

50% of hepatitis C infections leads to chronic liver disease (treat with interferon- α). Liver disease from chronic cholestasis occurs in cystic fibrosis. Alpha1 antitrypsin deficiency causes both cirrhosis and emphysema. Haemochromatosis is autosomal recessive and is characterized by excessive iron deposition in various organs causing organ failure (diabetes, heart failure, chronic liver disease, hypogonadism, skin pigmentation and arthritis). Haemosiderosis usually arises due to parenteral iron overload e.g. in patients with aplastic anaemia after multiple transfusions. It is not commonly associated with cirrhosis. If cirrhosis does develop as a result of massive iron overload the condition is known as secondary haemochromatosis.

92- A 25-year-old previously healthy woman has worsening fatigue with dyspnoea, palpitations, and fever over the past one week. Her vital signs on admission to the hospital show Temperature 38.9°C Respiratory rate 30/min Pulse 105 bpm and BP 95/65 mmHg. Her heart rate is irregular. An ECG shows diffuse ST-T segment changes. A Chest X-ray shows mild cardiomegaly. An echocardiogram shows slight mitral and tricuspid regurgitation but no valvular vegetations. Her troponin I is 12 ng/mL. She recovers over the next two weeks with no apparent sequelae. Which of the following laboratory test findings best explains the underlying etiology for these events?

- 1) ANCA titer of 1:80 [0]
- 2) Anti-streptolysin O titer of 1:512 [0]
- 3) Blood culture positive for Streptococcus, viridans group [0]
- 4) Coxsackie B serologic titer of 1:160 [100]
- 5) Total serum cholesterol of 9.6 mmol/l [0]

She has findings that suggest myocarditis, which can have features of cardiomyopathy. One of the most likely organisms is Cocksackie B virus.

93- A 18 year old homosexual male developed progressive pneumonia not responding to antibiotics. Methenamine silver staining of the sputum showed small circular cyst and Giemsa staining demonstrated the small, punctate nuclei of the trophozoites and intracystic sporozoite. Which is the most likely organism?

- 1) Toxoplasma gondii [0]
- 2) Trypanosoma cruzi [0]
- 3) Cryptococcus neoformans [0]
- 4) Leishmania donovani [0]
- 5) Pneumocystis carinii [100]

The organism is Pneumocystis carinii. The organism may be identified on microscopy after (a) methenamine silver staining for the cyst phase of the organism ;(b) Giemsa staining that demonstrates the small, punctate nuclei of the trophozoites and intracystic sporozoites; or (c) fluorescence-tagged monoclonal antibody.

94- Which is true of herpes simplex encephalitis?

- 1) brain MRI is characteristically normal [0]
- 2) fits are uncommon [0]
- 3) genital herpes is usually present [0]
- 4) temporal lobe involvement is common [100]
- 5) viral identification using polymerase chain reaction on CSF is non-specific [0]

Herpes simplex encephalitis (HSE) is associated with high signal in one or both temporal lobes (limbic encephalitis). Seizures are commonly present in HSE. Herpes Simplex Virus type 1 is the causative virus (Not type 2 which is associated with genital herpes). PCR for herpes simplex virus on CSF is highly specific test.

95- A 38 year old female presents with red target lesions confined to the hands and is diagnosed with erythema multiforme. Which of the following could be the cause?

- 1) Cytomegalovirus infection [0]
- 2) Ureaplasma urealyticum [0]
- 3) Group B Streptococci [0]
- 4) Langerhan's cells histiocytosis [0]
- 5) Penicillin V [100]

Potential causes of erythema multiforme include:

INFECTIONS:

viruses: herpes simplex 1 and 2, hepatitis B, EBV, enteroviruses.

small-agents: mycoplasma pneumoniae.

bacteria: Group A Streptococcus, eosinophilia.

other: mycobacterium TB, histoplasma, coccidioides.

NEOPLASIA:

leukaemia

lymphoma.

ANTIBIOTICS:

penicillins, sulphonamides, isoniazid, tetracycline.

ANTICONVULSANTS:

phenytoin, phenobarbitone, carbamazepine.

OTHER:

aspirin, radiation therapy, etoposide, NSAIDs, sunlight, pregnancy.

96- In the diagnosis of rheumatic fever, which of the following may be helpful?

- 1) A generalised macular-papular rash. [0]
- 2) ASO titre of less than 1:200. [0]
- 3) Polyarthritis. [100]
- 4) Staphylococcus aureus grown on throat culture. [0]
- 5) Splinter haemorrhages. [0]

A Jones criteria require two major or one major and two minor, and evidence of recent streptococcal infection for the diagnosis of rheumatic fever. MAJOR: - Pancarditis. - Polyarthritis - Erythema marginatum - Chorea - Subcutaneous nodules - The rash is macular. MINOR: - Fever - Polyarthralgia - History of RF - Raised ESR/CRP - Prolonged PR interval on ECG.

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97- A 56-year-old man from Thailand presented with abdominal pain and a mass in the right upper quadrant. He reported that he had been diagnosed with viral hepatitis several years previously. Investigations showed:

Serum alpha-fetoprotein 13,500 IU/L (< 10)

What is the most likely underlying viral infection?

- 1) Hepatitis A virus [0]
- 2) Hepatitis B virus [100]
- 3) Hepatitis C virus [0]
- 4) Hepatitis D virus [0]
- 5) Hepatitis E virus [0]

Very difficult! The patient has chronic viral hepatitis and presents with a hepatoma. The underlying cause must be either HBV or HCV. There is a higher prevalence of HBV in the Far East and since his country of origin is the only other detail that gives a clue to the cause of his hepatitis, the most likely viral agent is HBV.

98- Regarding pneumonia caused by Legionella pneumophila, which of the following is true?

- 1) is associated with hyponatremia [100]
- 2) is best treated with intravenous amoxycillin and clavulanic acid [0]
- 3) is common in AIDS patients [0]
- 4) is readily diagnosed by standard aerobic culture of sputum [0]
- 5) should be managed on the ward in a respiratory isolation cubicle [0]

Legionella pneumophila is a Gram-negative bacillus that is ubiquitous in the environment. Human infection occurs when a sufficient inoculum of bacteria are aerosolised and inhaled. A variety of environmental sources have been identified as reservoirs of Legionella and have been responsible for infection in humans, including air conditioners, humidifiers, shower units and jacuzzis. Legionellae do not grow on standard culture media, but require specific supplemented media; they grow best at a low pH. Legionella pneumonia is commoner in men than women (3:1). Other factors that predispose to infection include smoking, alcoholism, old age, chronic illness, immunosuppressive therapy. Legionella is not common in AIDS, though patients with advanced disease will be at increased risk. Erythromycin or clarithromycin are the antibiotics of choice; alternatives include doxycycline, co-trimoxazole or ciprofloxacin.

More:<http://www.emedicine.com/med/topic1273.htm>

Sexually Transmitted

1- A 19-year-old male student attends casualty complaining of an urethral discharge. Gram stain shows numerous neutrophils, some of which contain gram-negative intracellular diplococci. The patient is treated with Ceftriaxone, 250 mg as an im injection. Five days later, the patient re-attends with persisting discharge.

Which of the following is the most likely cause of this discharge?

- 1) Chlamydia trachomatis [100]
- 2) Penicillin-resistant Neisseria gonorrhoeae [0]
- 3) Re-infection with Neisseria gonorrhoeae [0]
- 4) Ureaplasma urealyticum [0]
- 5) Urethral stricture [0]

This patient has been adequately treated for gonorrhoea and a persistent discharge would be unusual unless as is often the case, there is a co-infection. The patient is likely to have a non-specific urethritis due to Chlamydia trachomatis, requiring treatment with either doxycycline or erythromycin for 7-14 days.

2- A 27 year old man presents with fever, urethritis and arthralgia. He is found to have a swollen ankle with a pustular rash on the dorsal aspect of his foot.

What is the most likely diagnosis?

- 1) Gonococcal sepsis [100]
- 2) Lyme disease [0]
- 3) Reiter's syndrome [0]
- 4) Staphylococcal arthritis [0]
- 5) Tuberculous arthritis [0]

The most likely cause for this acute presentation is gonococcal septicaemia - with a pustular rash on the dorsum of his foot, fever, urethritis and oligoarthritis. Reiter's is associated with an acute infection – urethritis/diarrhoea and later the development of an arthritis.

3- A 22 year old male presents with generalised pruritus of six weeks duration. Examination reveals little except for erythematous papules between the fingers. Which of the following therapies would be most appropriate for this patient?

- 1) Astemizole [0]
- 2) Calamine lotion [0]
- 3) Chlorpromazine [0]
- 4) Ciprofloxacin [0]
- 5) Permethrin cream [100]

This patient has scabies, a highly contagious disease caused by the mite, *Sarcoptes Scabiei*. Appropriate treatment includes Permethrin cream topical Benzyl Benzoate or malathion.

Miscellaneous

1- Which ONE of the following is a recognised feature of achondroplasia?

- 1) Autosomal recessive inheritance [0]
- 2) May be diagnosed radiologically at birth [100]
- 3) Increased liability to pathological fractures [0]
- 4) Shortened spine [0]
- 5) Subfertility [0]

ACHONDROPLASIA is an autosomal dominant condition and one of the commonest forms of inherited dwarfism. Epiphyseal dysplasia - thin zone of cartilage cells, diminished columnar arrangement short thick bones, spinal length almost always normal. Features - short limbs, normal trunk, large head, saddle nose, exaggerated lumbar lordosis normal mental and sexual development, spinal problems. Homozygotes - neonatal death (Harrisons)

Communication Skills

1- A 45-year-old woman noticed tinnitus in her left ear which progressed over some weeks to hearing loss in that ear. On physical examination she is found to have a marked decrease in hearing on the left, with Rinne test indicating air conduction better than bone conduction. The other cranial nerves I - VII and IX - XII are intact. A brain MRI scan revealed a solitary, fairly discrete, 3 cm mass located in the region of the left cerebellopontine angle. Which of the following statements is most appropriate to tell the patient regarding these findings?

- 1) A test for HIV-1 is likely to be positive [0]
- 2) Other family members should undergo MR imaging of the brain [0]
- 3) Remissions and exacerbations are likely to occur in coming years [0]
- 4) The lesion can be resected with a good prognosis [100]
- 5) You are unlikely to survive for more than a year [0]

These acoustic neuromas are benign neoplasms. A solitary mass is unlikely to be part of neurofibromatosis (which could be familial).

2- A 35-year-old healthy woman has a faint systolic murmur on physical examination. An echocardiogram is performed, and she is found to have a bicuspid aortic valve. In explaining the meaning of this finding to her, the most appropriate statement is that?

- 1) An aortic valve prosthesis may eventually need to be placed [100]
- 2) Other family members may have the same condition [0]
- 3) She should be treated with a cholesterol-lowering agent [0]
- 4) The problem resulted from past injection drug usage [0]
- 5) This is one manifestation of an underlying autoimmune disease process [0]

Bicuspid aortic valve is perhaps the most common form of congenital heart disease in adults. Bicuspid valves have a propensity to wear out and calcify with aging. Bicuspid aortic valve tends to be a sporadic.

Geriatrics

1- An 85 year old patient from an elderly care home, experiences sudden onset of dyspnea and palpitations. A pulmonary ventilation-perfusion scan is performed and indicates a high probability for a perfusion defect involving a pulmonary arterial branch.

Which of the following findings or conditions is the one that is the most important factor favouring development of her complaint?

- 1) A neutrophilia [0]
- 2) An increased platelet count [100]
- 3) Cirrhosis of the liver [0]
- 4) Generalized atherosclerosis [0]
- 5) Poor nutrition [0]

This would lead to a prothrombotic state, increasing the risk of pulmonary embolism. Cirrhosis, and possibly poor nutrition, would lead to decreased production of coagulation factors thus prolonging the INR. A neutrophilia would suggest infection leading to ventilation defect, and not a perfusion defect. Atherosclerosis would predispose to arterial thrombo-embolus.

2- Osteomalacia may be expected in

- 1) Sarcoidosis [0]
- 2) Auto-immune adrenalitis [0]
- 3) Pseudo-hypoparathyroidism [0]
- 4) Pernicious anaemia [0]
- 5) Mercury poisoning [100]

Osteomalacia may occur with vitamin D deficiency. Mercury poisoning or any heavy metal poisoning causes an acquired Fanconi syndrome with distal renal tubular acidosis.

3- A 60-year-old man presents with an episode of memory loss. Three days earlier he had become confused. His wife led him into the house - he apparently sat down at her request, and had a cup of tea. He then wandered around the house, confused, but remained conscious and able to have some conversation with his wife, though continuing to ask similar questions repeatedly. After three hours, he abruptly returned to normal and had no recollection of the events. What is the most likely diagnosis?

- 1) alcohol related amnesia [0]
- 2) chronic subdural haematoma [0]
- 3) complex partial status epilepticus [0]
- 4) hysterical fugue state [0]
- 5) transient global amnesia [100]

This is the typical clinical description of transient global amnesia which represent a transient vascular insufficiency of both hippocampi.

4- Which of the following is a recognised feature of polymyalgia rheumatica:

- 1) weakness of distal muscle groups [0]
- 2) elevated serum creatine phosphokinase activity [0]
- 3) an association with bronchial carcinoma [0]
- 4) weight loss [100]
- 5) a peak incidence in the fourth decade of life [0]

a-stiffness weakness is more typical of polymyositis b-would suggest polymyositis d-typical e-later in life

5- Which of the following features is characteristic of early Alzheimer's disease?

- 1) ataxic gait [0]
- 2) impaired short term memory [100]
- 3) myoclonic jerks [0]
- 4) urinary incontinence [0]
- 5) visual hallucinations [0]

Alzheimer's disease is characterised early in the disease by short term memory loss. The other features listed here would suggest an alternative diagnosis such as normal pressure hydrocephalus (gait ataxia and urinary incontinence), Creutzfeldt-Jacob disease (myoclonic jerks) and delirium or vascular dementia (visual hallucinations).

Creutzfeldt-jacob disease-features

rare

F:M 1.5:1

familial 6%

50-65yrs onset

vague prodrome-dizzy

insomnia-25%

abrupt onset focal signs

aphasia

ataxia
 hemianopia
 limb weakness
 rapid deterioration
 myoclonus common
 death 3 weeks to 18/12
 CSF inc. protein slightly
 no pleocytosis
 CT normal
 EEG infrequent bursts of low freq.
 neurosurgical
 PM
 corneal transmission
 ?slow virus-prion
 variant-?Gertsman-Strussler synd.
 progressive ataxia
 dementia
 pyramidal signs
 earlier age of onset

6- A 60-year-old man with a past history of controlled hypertension presents with acute onset weakness of his left arm, that resolved over 12 hours. He had suffered two similar episodes over the last three months. Examination reveals a blood pressure of 132/82 mmHg and he is in atrial fibrillation with a ventricular rate of 85 per minute. CT brain scan is normal.

What is the most appropriate management?

- 1) amiodarone [0]
- 2) aspirin [0]
- 3) digoxin [0]
- 4) dipyridamole [0]
- 5) warfarin [100]

This patient has had three transient ischaemic attacks due to atrial fibrillation. The most appropriate therapeutic strategy for this patient would be warfarin. Studies reveal that warfarin would be therapeutically superior than aspirin in such a patient's case.

7- A patient presented with a quadrantic hemianopia. Which of the following conditions is most likely to cause such a presentation?

- 1) a lesion of the occipital cortex [100]
- 2) a lesion of the optic chiasma [0]
- 3) bilateral diabetic retinopathy [0]
- 4) chloroquine poisoning [0]
- 5) tobacco amblyopia [0]

A lesion of the optic chiasma would cause a bitemporal hemianopia. Diabetic retinopathy may cause an "apparent quadrantic hemianopia" because the distribution of the retinal changes may just correspond to quadrantic hemianopia - but this is not

the most likely. Tobacco amblyopia causes symmetric central or centrocaecal scotomas. Chloroquine poisoning causes symmetric bilateral scotomas.

8- A 62-year-old lady is suffering from pain and stiffness of her shoulders and difficulty getting out of a chair. Which of the following would support a diagnosis of polymyalgia rheumatica?

- 1) ankle stiffness [0]
- 2) low grade fever [100]
- 3) muscle tenderness [0]
- 4) proximal muscle weakness [0]
- 5) weight gain [0]

Polymyalgia rheumatica presents with early morning stiffness of the shoulder and pelvic girdles, fever, anorexia, weight loss and malaise. There is no muscle tenderness or weakness and the feet are never affected. Investigations may reveal normochromic / normocytic anaemia, raised ESR often > 50 mm/hr, raised ALP and raised CRP. Features of Giant Cell arteritis should be sought - headache, visual disturbance, TIAs, jaw claudication and thickened, tender, pulseless temporal arteries. Diagnosis is by temporal artery biopsy and / or characteristic response to steroids.

9- A 72-year-old lady has 4 months of memory loss, urinary incontinence and falls. On examination she has mild memory loss and a broad-based, slow gait. Muscle tone is normal and both plantar reflexes are downgoing. What is the likely diagnosis?

- 1) Alzheimer's disease [0]
- 2) Frontal lobe dementia [0]
- 3) Multi-infarct dementia [0]
- 4) Normal-pressure hydrocephalus [100]
- 5) Parkinson's disease [0]

Normal pressure hydrocephalus characterized by abnormal gait, urinary incontinence, and dementia. It is an important clinical diagnosis, because it is a potentially reversible cause of dementia. It is important to distinguish it from Parkinson's Disease. The onset of gait disturbance and urinary symptoms is unusual so early in dementia. Frontal lobe dementia is characterised by loss of 'executive' functions and multi-infarct state usually has a step-wise history.

10- A 70-year-old woman presented with episodic impairment of consciousness. Which of the following is the most likely cause?

- 1) Alzheimer type dementia [0]
- 2) chronic sub-dural haematoma [100]
- 3) Creutzfeldt-Jacob disease [0]
- 4) depressive stupor [0]
- 5) normal pressure hydrocephalus [0]

This is quite a grey question. The clinical scenario is very brief with no mention of any neurological signs so a logical deduction must be made.

Alzheimer's disease would be expected to have a continuous impairment of consciousness in its advanced stages but could be episodic if there were variation in drugs therapy or concurrent illnesses. Similarly Normal Pressure Hydrocephalus, Creutzfeld-Jacob and depression would present with dementia (or apparent dementia) but not fluctuant.

Of all those listed subdural haematoma is classically associated with fluctuating level of consciousness. This would make it the most likely.

11- Which ONE of the following is associated with Parkinsonian features?

- 1) Chronic carbon dioxide retention [0]
- 2) Kernicterus [0]
- 3) Lead poisoning [0]
- 4) Mercury poisoning [0]
- 5) Wilson's disease [100]

Poisons that can cause parkinsonism include manganese, carbon monoxide, carbon disulfide, the cycad nut and the illicit drug MPTP (methyl-phenyl tetrahydropyridine). There are also other diseases of the brain that combine parkinsonism. These include Wilson's disease, Huntington's disease, Shy-Drager syndrome, striatonigral degeneration, olivo-ponto-cerebellar degeneration, cortical-basal ganglionic degeneration, progressive supranuclear palsy, diffuse Lewy body disease, Creutzfeldt-Jacob disease and even Alzheimer's disease

12- Temporal lobe lesions cause:

- 1) Apraxia [0]
- 2) Astereogenesis [0]
- 3) Primitive reflexes [0]
- 4) Visuospatial neglect [0]
- 5) Wernike's (receptive) aphasia [100]

Lesions of the frontal lobe include difficulties with task sequencing and executive skills. Expressive aphasia (receptive aphasia is a temporal lobe lesion), primitive reflexes, perseveration (repeatedly asking the same question or performing the same task), anosmia and changes in personality. Lesions of the parietal lobe include apraxias, neglect, astereognosis (unable to recognise an object by feeling it) and visual field defects (typically homonymous inferior quadrantanopia). They may also cause acalculia (inability to perform mental arithmetic). Lesions of the temporal lobe cause visual field defects (typically homonymous superior quadrantanopia), Wernike's (receptive) aphasia, auditory agnosia, and memory impairment. Occipital lobe lesions include cortical blindness (blindness due to damage to the visual cortex and may present as Anton syndrome where there is blindness but the patient is unaware or denies blindness), homonymous hemianopia, and visual agnosia (seeing but not perceiving objects - it is different to neglect since in agnosia the objects are seen and followed but cannot be named).

13- A 72-year-old woman has a five year history of worsening mental functioning with trouble remembering things. She has no problems with movement. She is noted on an MRI scan of the brain to have symmetrically increased size of the lateral ventricles along with cerebral cortical atrophy in a mainly frontal and parietal distribution. A lumbar puncture reveals a normal opening pressure, and analysis of the clear, colorless cerebrospinal fluid reveals a glucose and protein which are in normal ranges. Cell count on the CSF shows 3 WBCs (all lymphocytes) and 1 RBC. A fundoscopic examination is normal. Which of the following findings is most likely associated with her underlying disease process?

- 1) Increased numbers of Lewy bodies [0]
- 2) Loss of Betz cells [0]
- 3) Loss of gamma aminobutyric acid (GABA) [0]
- 4) Perivascular mononuclear inflammation [0]
- 5) Presence of the e4 allele of apolipoprotein E [100]

She has findings characteristic for Alzheimer's disease. Loss of GABA is seen in Parkinson's disease. Perivascular mononuclear inflammation is seen in multiple sclerosis. Loss of Betz cells is seen in Motor Neurone Disease.

14- A 74-year-old man has had increasingly severe, throbbing headaches for several months, centered on the right. There is a palpable tender cord-like area over his right temple. His heart rate is regular with no murmurs, gallops, or rubs. Pulses are equal and full in all extremities, BP is 110/85 mmHg. A biopsy of this lesion is obtained, and histologic examination reveals a muscular artery with luminal narrowing and medial inflammation with lymphocytes, macrophages, and occasional giant cells. He improves with a course of high-dose corticosteroid therapy. Which of the following laboratory test findings is most likely to be present with this disease?

- 1) Anti-double stranded DNA titer of 1:1024 [0]
- 2) Erythrocyte sedimentation rate of 110 mm/hr [100]
- 3) HDL cholesterol of 0.6 mmol/L [0]
- 4) pANCA titer of 1:160 [0]
- 5) Rheumatoid factor titer of 80 IU/mL [0]

These are classic findings for temporal arteritis, the most typical involvement with giant cell arteritis. Corticosteroid therapy typically produces a reduction of symptoms. Not treating this condition puts the patient at risk for involvement of other branches of the external carotid artery, the worst of which would be the ophthalmic branch.

Nephrology

1- A 25-year-old man developed bilateral loin pain and frank haematuria. His symptoms had started 24 hours after developing a sore throat. His blood pressure was 138/88 mmHg. Urinalysis was positive for blood (4+) and protein (2+).

What is the most likely diagnosis?

- 1) IgA nephropathy [100]
- 2) microscopic polyangiitis [0]
- 3) nephrolithiasis [0]
- 4) post-streptococcal glomerulonephritis [0]
- 5) septicaemia [0]

The patient has macroscopic haematuria, proteinuria and loin pain in association with pharyngitis. IgA nephropathy typically presents as recurrent haematuria in young men, often precipitated by upper respiratory tract infections; loin pain is well described; patients may be normotensive or hypertensive. Although acute post-streptococcal glomerulonephritis (APSGN) is a recognised complication of streptococcal pharyngitis, there is always a latent period of 1-2 weeks between the streptococcal infection and onset of signs and symptoms of acute glomerulonephritis (oedema, hematuria, and hypertension); loin pain is not well-recognised. Nephrolithiasis is associated with loin pain and haematuria, but the degree of proteinuria is too great in this case.

"Although the clinical presentation of IgAN varies from asymptomatic urinary abnormalities to acute renal failure, 5 different clinical syndromes are generally recognized"... more ...

2- A 70 year old female is admitted 12 hours after taking an overdose of aspirin. Investigations revealed: Serum sodium 138 mmol/L (137-144), Serum potassium 5.9 mmol/L (3.5-4.9), Serum bicarbonate 14 mmol/L (20-28), Serum urea 18.1 mmol/L (2.5-7.5), Serum creatinine 238 umol/L (60-110), Serum salicylate 1120 mg/L (8 mmol/L). What is the most appropriate treatment of this patient?

- 1) Haemodialysis [100]
- 2) Haemofiltration [0]
- 3) Intravenous sodium bicarbonate. [0]
- 4) Peritoneal dialysis. [0]
- 5) Urine alkalinization. [0]

This patient is at major risk of aspirin toxicity as reflected by the excessive aspirin concentration and appears to have developed acute renal failure –is acidotic with an elevated potassium. Bicarbonate is recommended as a supportive therapy but in this patient, Haemodialysis is the treatment of choice. The latter is advised when the plasma-salicylate concentration is greater than 700 mg/litre (5.1 mmol/litre) or in the presence of severe metabolic acidosis as recommended within the BNF poisons section.

3- Which of the following is associated with Hyperuricaemia?

- 1) is usually due to an excess purine consumption [0]

- 2) occurs in association with acute lymphoblastic leukaemia [100]
- 3) in primary gout is inherited in an autosomal dominant manner [0]
- 4) can be reduced with low dose aspirin therapy [0]
- 5) can be treated with uricosuric drugs even in renal failure [0]

Hyperuricaemia may be due to increased purine intake, urate production or reduced urate clearance, and is most commonly due to the latter. Therefore it can occur in association with enhanced cell destruction particularly leukaemias. Primary gout has no obvious mode of inheritance, but familial juvenile gouty nephropathy is an autosomal dominantly inherited disorder. Low dose aspirin may exacerbate gout but high dose aspirin is uricosuric. Many of the uricosuric drugs may be detrimental in renal failure and may not be effective

4- A 67 year old man presents with sudden onset atrial fibrillation (ventricular rate of 150/minute). His serum creatinine concentration was 250 $\mu\text{mol/L}$ (70-110).

What is the main factor that determines the choice of loading dose of digoxin in this patient?

- 1) Absorption [0]
- 2) Apparent volume of distribution [0]
- 3) Lipid solubility [0]
- 4) Plasma half-life [0]
- 5) Renal clearance [100]

The pharmacokinetics of digoxin are complex and best explained by a two compartment model. The loading dose is mainly dependent on the Volume of Distribution of a drug but this patient has moderate renal failure. The loading dose is calculated (using various models) by taking into account age, creatinine clearance, body surface area etc. Volume of distribution becomes important particularly when body weight is 40kg or less. On balance it is the renal failure that is the most important factor in this patient in determining the loading dose.

Digoxin is cleared by the kidneys so the maintenance dose would require adjustment in renal failure.

5- The following are complications of nephrotic syndrome with the exception of

- 1) acute renal failure [0]
- 2) accelerated hypertension [100]
- 3) hypocalcaemia [0]
- 4) pneumococcal infection [0]
- 5) venous thrombosis [0]

Complications also include hyperlipidaemia, protein malnutrition and loss of binding proteins in urine. Nephrotic syndrome likely to be associated with hypocalcaemia (Vit D binding protein and Vitamin D lost in nephrotic urine) and hypovolaemia (low blood pressure).

6- Autosomal recessive conditions include:

- 1) Vitamin D resistant rickets [0]
- 2) Huntingdon's chorea [0]
- 3) Wilson's disease [100]
- 4) Manic depression [0]
- 5) Turner's syndrome [0]

Vitamin D resistant rickets = X-linked dominant. No linkage has been established for a particular gene in manic depressive disorder.

7- A 44-year-old woman with type 1 diabetes mellitus has not attended the diabetic clinic for 5 years. Her HbA1c is 10.1%. Examination shows no abnormalities. Her hemoglobin level is 9 g/dL, hematocrit is 28%, and mean corpuscular volume is 94 mcm³. A blood smear shows normochromic, normocytic anaemia. Which of the following is the most likely cause?

- 1) acute blood loss [0]
- 2) chronic lymphocytic leukaemia [0]
- 3) erythropoietin deficiency [100]
- 4) microangiopathic haemolysis [0]
- 5) sideroblastic anaemia [0]

The most likely cause is progressive renal failure which leads to reduced release of erythropoietin from the kidneys. Sideroblastic anaemia (myelodysplasia) is seen in older age groups. CLL or microangiopathic haemolysis are possible causes but unlikely.

8- A 60-year-old woman is admitted with sudden onset of chest pain and is diagnosed with an acute myocardial infarction. Her acute illness is complicated by low blood pressure and poor tissue perfusion for several days. Her serum lactate becomes elevated. Her serum urea and creatinine are noted to be increasing.

	Day 1	Day 2	Day 3
urea (mmol/L)	8	22	30
creatinine (μmol/L)	116	140	200

Granular and hyaline casts are present on microscopic urinalysis. The renal lesion that is most likely to be present in this situation is?

- 1) Acute tubular necrosis [100]
- 2) Minimal change disease [0]
- 3) Nodular glomerulosclerosis [0]
- 4) Pyelonephritis [0]
- 5) Renal vein thrombosis [0]

Ischaemia, typically in hypotensive hospitalized patients, is the most frequent antecedent to acute tubular necrosis. Blood pressure should be maintained in cardiogenic shock with fluids and / or inotropic agents.

9- A 25-year-old man developed bilateral loin pain and frank hematuria. His symptoms had started 24 hours after developing a sore throat. His blood pressure was 138/88 mmHg. Urinalysis was positive for blood (4+) and protein (2+).

What is the most likely diagnosis?

- 1) IgA nephropathy [100]
- 2) microscopic polyangiitis [0]
- 3) nephrolithiasis [0]
- 4) post-streptococcal glomerulonephritis [0]
- 5) septicaemia [0]

The acute onset of the disease is suggestive of IgA nephropathy which characteristically occurs in young males in their 20s and 30s. Haematuria occurs within 12-24 hours of pharyngitis, accompanied also by loin pain, muscle pain and fever. Prognosis is usually good especially in children. In adults, between 25-50% may develop end-stage renal failure. No specific treatment available. Classically, patient has streptococcal infection 1-3 weeks before the onset of acute nephritic syndrome (post-strep GN). There is a long prodromal systemic illness lasting months or years in microscopic polyangiitis which differs from Wegener's granulomatosis in its absence of respiratory tract granulomatous inflammation.

10- Which of the following concerning renal blood flow is true?

- 1) is 40% of the cardiac output at rest [0]
- 2) can be measured using the Fick principle [100]
- 3) is higher in the medulla than the cortex [0]
- 4) is increased when renal nerves are stimulated [0]
- 5) is decreased in response to hypoxia [0]

Renal blood flow is approximately 25% of cardiac output. The 'Fick principle' can be used to estimate RBF through clearance. RBF is higher in the cortex than medulla as one might expect with the increasing glomeruli in this region. Sympathetic stimuli produce vasoconstriction and RBF should be increased in response to hypoxia.

11- What is the most likely outcome of minimal change nephropathy at 16 year of age?

- 1) a tendency to relapse [0]
- 2) full renal recovery [100]
- 3) permanent renal impairment [0]
- 4) persistent hypertension [0]
- 5) persistent proteinuria [0]

30-40% of children achieve spontaneous remission and 90% achieve remission following 8 weeks treatment with high dose steroids. However in adults only around 50% achieve remission.

12- Which of the following concerning the pH of urine is correct?

- 1) is a useful indicator of the acid/base balance of the blood [0]

- 2) rises on a vegetarian diet [100]
- 3) is determined by the concentration of ammonium [0]
- 4) is lower than 5.5 in renal tubular acidosis [0]
- 5) would be above 7.0 after prolonged and severe vomiting [0]

c - excretion of ammonium occurs when an acid urine is produced but the pH of urine is of course determined by the concentration of H^+ ions d-unable to lower the pH to less than 5.5 in RTA e- This would be expected in an attempt to compensate for the loss of acid however when there is extracellular fluid depletion the retention of sodium takes priority. Instead of bicarbonate being excreted it is reabsorbed in the proximal and distal nephron and this perpetuates the metabolic alkalosis until the fluid balance is restored with IV fluids.

13- A 2 week old male child is brought to casualty by his concerned parents with diarrhoea and vomiting. He is the first child of a young couple. Examination reveals few features besides obvious dehydration. He is noted to have a penile length of 3.5cms. Which of the following is the most appropriate initial treatment for this patient?

- 1) Cow's milk allergy is the most likely diagnosis [0]
- 2) gluten-enteropathy should be excluded [0]
- 3) Requires urgent treatment with oral steroids [0]
- 4) Requires urgent treatment with IV normal saline [100]
- 5) Rota virus gastroenteritis is the most likely diagnosis [0]

The history suggests a diagnosis of classical congenital adrenal hyperplasia which is commonly due to 21 hydroxylase deficiency. A variable presentation is typical but neonatal presentations include salt losing crisis, penile development in the male virilisation and ambiguous genitalia in females. Patients should initially be resuscitated with fluid, usually saline and if suspicious, urgent biochemistry requested for cortisol, 17OHP etc prior to administration of intravenous steroids.

14- Which one of the following statements regarding renal function is correct?

- 1) The daily solute excretion will lie between 75 and 300 mosmol [0]
- 2) The permeability of the distal nephron to water increases in the presence of vasopressin [0]
- 3) The rate of ammonium excretion in urine is inversely related to the rate of urinary hydrogen ion excretion [0]
- 4) A ten minute period of hyperventilation will normally be expected to lead to an increased rate of bicarbonate excretion in urine [100]
- 5) Sodium reabsorption in the tubules is mainly controlled by aldosterone [0]

AVP acts on the collecting ducts increasing permeability to water. The total solute excretion is approximately 700 mosmol/d. Sodium reabsorption is mostly through active transport in the loop of Henle with only a modest reabsorption facilitated by aldosterone. A ten minute period of hyperventilation would cause a respiratory alkalosis leading to an increased secretion of bicarbonate and retention of Hydrogen

ions. The rate of ammonium excretion is proportional to the rate of hydrogen ion excretion.

15- Which of the following are true of chronic renal failure in childhood?

- 1) is unlikely to be due to chronic pyelonephritis unless there is a clear history of an acute attack [0]
- 2) if accompanied by renal osteodystrophy is likely to be associated with severe hypertension [0]
- 3) is an unusual sequel of acute post-streptococcal glomerulo-nephritis [100]
- 4) is the most common sequel to the nephrotic syndrome [0]
- 5) is likely to be benefited by administration of corticosteroids [0]

CRF may occur in childhood as a consequence of inherited disorders such as Alport's from recurrent infection and reflux disease. Renal function usually resolves post-strep GN.

16- Acute renal failure may be distinguished from chronic renal failure by which of the following?

- 1) an increased urinary Na excretion [0]
- 2) left ventricular hypertrophy on the ECG [0]
- 3) hypophosphataemia [0]
- 4) renal size on ultrasound scan [100]
- 5) hyperkalaemia [0]

Small kidneys on USS suggest chronic renal failure but the following causes of chronic renal failure can present with normal / enlarged kidneys - amyloidosis, polycystic kidney disease, diabetic glomerulosclerosis, scleroderma and rapidly progressive glomerulonephritis.

Decreased fractional Na clearance, hyperphosphataemia and hyperkalaemia are features of acute or chronic renal failure.

LVH is probably more likely to be seen in chronic renal failure but is not reliable.

17- Which one of the following statements is correct?

- 1) adult polycystic renal disease is inherited as an autosomal recessive trait [0]
- 2) reflux nephropathy is inherited as an autosomal recessive trait [0]
- 3) nephrogenic diabetes insipidus is inherited as an autosomal dominant trait [0]
- 4) Alport's syndrome affects females more severely than males [0]
- 5) medullary sponge kidney is typically not inherited but is a congenital condition. [100]

PKD is usually autosomal dominant although the infantile form is autosomal recessive. Nephrogenic DI is usually X-linked. Features of Alport syndrome (hereditary nephritis, haematuria, progressive renal failure and high-frequency nerve deafness) are usually more marked in males. Neither reflux nephropathy nor medullary sponge kidneys are hereditary conditions.

18- Metastatic calcification in chronic renal failure:

- 1) unaffected by time on CAPD [0]
- 2) rapidly reversed in all sites after parathyroidectomy [0]
- 3) characteristically caused by calcium oxalate deposition [0]
- 4) increased prevalence with time on haemodialysis [100]
- 5) decreased by Vitamin D [0]

CRF associated with low serum calcium, hyperphosphataemia, increased PTH, reduced intestinal calcium absorption and raised alkaline phosphatase. Parathyroidectomy improves extraskeletal calcification, but vascular calcification improves less than periarticular calcification. Metastatic calcification due mainly to calcium phosphate deposition, although CRF managed with dialysis is the commonest cause of secondary oxalosis (acute arthritis of small joints with digital calcific deposits). Prolonged treatment with Vitamin D (hence hypercalcaemia and hyperphosphataemia) increases extraskeletal calcification.

19- A 33 year old male is receiving regular haemodialysis is noted to have a plasma potassium of 6.9 mmol/L (3.5-4.9) before a dialysis session. Although normally his potassium is less than 5.5 mmol/L.

Which food combination from the dietary history would be most likely to cause the high potassium concentration?

- 1) Cereal, toast, biscuits. [0]
- 2) Filter coffee, tea, boiled potatoes. [0]
- 3) Milk, butter, plain yoghurt [0]
- 4) Milk, ham, chicken. [0]
- 5) Tomato, potato crisps, banana. [100]

In particular tomato and banana have high potassium content and patients should be advised to avoid such foods.

20- Which of the following features would be expected in acute tubular necrosis?

- 1) Proteinuria on urinalysis [0]
- 2) Red cell casts on urinalysis [0]
- 3) Urine plasma osmolality ratio is more than 1:1 [0]
- 4) Urinary sodium concentration greater than 30 mmol/l [100]
- 5) Creatinine clearance would be expected to be normal 1 year after the initial insult. [0]

Proteinuria is typically expected. The urine sodium concentration is typically above 30 mmol/l and osmolality ratio <1:1. Red cell casts suggest nephritis and normalisation of the creatinine clearance occurs in only 40% of cases one year later.

21- In which of the following circumstances would the treatment of anaemia with erythropoietin still be expected to be effective?

- 1) Aluminium toxicity [0]
- 2) Folate deficiency [0]

- 3) Hyperkalaemia [100]
- 4) Infection [0]
- 5) Iron deficiency [0]

Epoetin (recombinant human erythropoietin) is used in chronic renal failure, to shorten the period of anaemia in those receiving platinum-based chemotherapy and prevention of anaemia in premature babies with low birth weight.

22- A 66-year-old man has developed chronic renal failure with a serum urea of 60 mmol/L and creatinine of 650 micromol/L. Auscultation of the chest reveals a friction rub over the cardiac apex. He is most likely to have a pericarditis that is termed?

- 1) Constrictive [0]
- 2) Fibrinous [100]
- 3) Hemorrhagic [0]
- 4) Purulent [0]
- 5) Serous [0]

The uraemia leads to exudation of fibrin onto the epicardial and pericardial surfaces. Haemorrhagic pericarditis is more typical of tuberculosis or metastatic tumour. Serous pericarditis is more typical of collagen vascular diseases.

23- Which of the following is characteristic of Bartter's Syndrome?

- 1) Secondary hyperaldosteronism [100]
- 2) Hyperkalaemia [0]
- 3) Metabolic acidosis [0]
- 4) Reduced renal concentrating ability [0]
- 5) Diarrhoea [0]

Bartter's Syndrome is a rare form of renal potassium wasting characterised by hypokalaemia, normotension, and elevated renin and aldosterone levels. It is occasionally autosomal recessive. There is hyperplasia of the juxtaglomerular apparatus in most cases. It is postulated that the primary defect is in chloride reabsorption in the ascending limb, resulting in sodium chloride excessively presented to the distal tubule, with sodium reabsorption in exchange for potassium, resulting in urinary sodium wasting. There is secondary stimulation of prostaglandin synthesis, which activates the renin angiotensin aldosterone system which exacerbates the renal potassium wasting. Growth failure, muscle weakness, constipation, polyuria and dehydration are typical in younger children with muscle weakness, cramps or carpopedal spasms present in older children. The potassium is $<2.5\text{mmol/L}$, there is metabolic alkalosis, and hyperammonaemia with hyperaldosteronism. There are high levels of urinary potassium and chloride. The high urinary chloride level is helpful in distinguishing it from similar presentations which have low urinary chloride levels, such as liquorice, laxative, or diuretic use, persistent vomiting or diarrhoea, pyelonephritis, or diabetes insipidus. Oral potassium and indomethacin may be used.

24- Which of the following is NOT a recognised cause of acute tubular necrosis?

- 1) Rhabdomyolysis [0]

- 2) Paracetamol poisoning [0]
- 3) Hypovolaemia [0]
- 4) Hypertension [0]
- 5) Corticosteroid therapy [100]

Renal failure from ATN occurs in 25% patients with severe hepatic damage. Accelerated hypertension can cause small vessel obstruction, with proliferative endarteritis of intralobular arteries and fibrinoid necrosis of afferent arterioles and glomerular capillary tuft.

25- A 49-year-old woman has been an inpatient for the past 10 days for treatment of a bronchopneumonia. She has developed the onset of chills, fever, and skin rash over the past two days. A peripheral blood film reveals eosinophilia. On urinalysis she has ++ proteinuria. There is no past history of renal disease. Her hemoglobin A1C is normal. These findings would most strongly suggest which of the following diagnoses?

- 1) Acute serum sickness [0]
- 2) Acute tubular necrosis [0]
- 3) Drug-induced interstitial nephritis [100]
- 4) IgA nephropathy [0]
- 5) Post-streptococcal glomerulonephritis [0]

The findings are typical of a drug-induced acute interstitial nephritis. Post-streptococcal GN appears weeks after the acute infection. Berger's disease (IgA nephropathy) is characterized by hematuria and often follows a 'flu-like' illness. Eosinophilia is not typical for serum sickness.

26- Oliguria more likely to be due to prerenal failure than intrinsic renal failure if:

- 1) urine free of red blood cells or casts [100]
- 2) urine:plasma urea ratio <3 [0]
- 3) urine osmolality <350 mOsm/l [0]
- 4) in the presence of hypertension, raised JVP and good peripheral circulation [0]
- 5) urinary sodium >10mM [0]

Oliguria defined as <400ml urine/day. Red cell casts present in acute glomerulonephritis, renal vasculitis, accelerated hypertension and interstitial nephritis. Pre-renal failure is renal dysfunction due to hypoperfusion (urinary sodium <20, urine osmolality >500, urine/plasma ratio >8, and urine/plasma creatinine >40) and acute tubular necrosis is acute renal failure due to circulatory compromise and/or nephrotoxins (urinary sodium >40, urine osmolality <350, urine/plasma ratio <3, and urine/plasma creatinine <20).

27- A 30 year old man had a blood pressure of 150/100 mmHg. Clinical examination was normal. Which one of the following would suggest secondary hypertension?

- 1) 24 hour urinary protein excretion of 1.6g (<0.2) [100]
- 2) A Creatinine clearance of 90 mL/min (70-140) [0]
- 3) Left ventricular hypertrophy criteria on the ECG [0]
- 4) The presence of arteriovenous nipping on fundoscopy. [0]

5) Serum potassium of 3.9 mmol/L (3.5-4.9) [0]

It is rather young for a 30 year old to be hypertensive but the presence of such a nephrotic range of urine protein would suggest renal origin – Polyarteritis nodosa etc. The potassium concentration is normal and although it does not exclude Conn's it is certainly not suggestive. LVH would be found with sustained hypertension of any aetiology as would av nipping. The creatinine clearance is normal.

28- Which of the following statements regarding idiopathic membranous nephropathy is correct?

- 1) It characteristically presents in the second decade of life. [0]
- 2) Progression to end-stage renal failure is rapid. [0]
- 3) immune complex deposits are typically seen in the glomerular mesangium. [0]
- 4) Males are twice as commonly affected as females. [100]
- 5) The nephritic syndrome is a characteristic presentation. [0]

Membranous nephropathy is characterised by thickened basement membranes and monotonous granular deposits of IgG and C3 distributed in the epimembranous space of virtually all glomerular capillaries. The mesangium may be involved at a later stage of the disease and is more typical of secondary disease. It is typically seen in the over 40 age group with a male predominance of 2 to 1 and is associated with a variable prognosis with 25% developing ESRF over 10 years and 25% going into remission. There is a higher rate of remission for the idiopathic form. The majority of patients manifest with a pure nephrotic syndrome. A nephritic presentation is rare.

29- In asymptomatic chronic renal failure:

- 1) there is increase in tubular excretion of urate [0]
- 2) serum ionised [calcium] is normal [100]
- 3) serum [phosphate] characteristically increased before GFR falls to 30ml/min [0]
- 4) increase serum [alkaline phosphatase] mainly due to liver isoenzyme [0]
- 5) decrease in blood pressure accompanied by increase in extracellular fluid [0]

Urate retention is common feature in CRF. Total serum [calcium] is reduced or at lower limits of normal, but ionised [calcium] is normal unless steps are taken to treat acidosis actively eg with sodium bicarbonate. Plasma phosphate and chloride are almost always raised. Hyperphosphataemia occurs when GFR falls <30ml/min. Increased bone alkaline phosphatase reflects osteodystrophy. Hypertension is due largely to salt and water retention, and also overactivity of renin angiotensin systems.

30- Anti-neutrophilic cytoplasmic autoantibodies:

- 1) positive only in Wegener's syndrome associated with renal disease [0]
- 2) cause neutropenia in SLE [0]
- 3) present in inflammatory bowel disease [100]
- 4) increased in systemic lupus erythematosus [0]
- 5) ANCA positive glomerulonephritis characteristically causes nephrotic syndrome [0]

85% of untreated subjects with Wegener's will have c-ANCA, and those with limited disease are less likely to have positive serology. p-ANCA is present in approximately 70% with ulcerative colitis and less than 20% of Crohn's patients. Neither p nor c-ANCA is typical of SLE. Initial renal damage causes proteinuria (focal proliferative glomerulonephritis) but renal function can deteriorate rapidly, with development of acute focal necrotising glomerulonephritis).

31- In chronic untreated renal failure which of the following findings is characteristic?

- 1) Metabolic alkalosis [0]
- 2) Hypokalaemia [0]
- 3) Hyperosmolar dehydration [0]
- 4) Hypercalcaemia [0]
- 5) Hypercalcinuria [100]

Major pathophysiological abnormalities of chronic renal failure:

Accumulation of nitrogenous waste products.

Acidosis: bicarbonate wasting, decreased ammonia secretion, decreased acid excretion.

Sodium wasting: solute diuresis, tubular damage.

Sodium retention: Nephrotic Syndrome, CCF, anuria, excess sodium intake.

Urinary concentrating defect: nephron loss, solute diuresis.

Hyperkalaemia: decreased GFR, acidosis, hyperaldosteronism.

Renal osteodystrophy: decreased intestinal calcium absorption, impaired 12-dihydroxy Vitamin D production, secondary hyperparathyroidism.

Growth retardation: protein calorie deficiency, renal osteodystrophy, acidosis, anaemia.

Anaemia: decreased erythropoietin production, low grade haemolysis, inadequate intake.

Bleeding tendency: thrombocytopenia, decreased platelet function.

Infection: defective granulocyte function.

Neurology: uraemia, aluminium toxicity results in fatigue, poor concentration, headache, memory loss, slurred speech, muscle weakness and cramps, seizures and coma.

GI ulceration: gastric acid hypersecretion.

Hypertension: sodium and water overload, hyperammonaemia.

Hypertriglyceridaemia: decreased plasma lipoprotein lipase activity.

Pericarditis and cardiomyopathy: cause unknown.

Glucose intolerance: tissue insulin resistance.

32- A 46-year-old woman develops nephrotic syndrome and is awaiting further tests to establish the underlying aetiology. In which circumstance would corticosteroids be most effective in reversing the nephrotic syndrome?

- 1) Membranous nephropathy [0]
- 2) Minimal change disease [100]
- 3) Primary amyloidosis [0]
- 4) Renal vein thrombosis [0]
- 5) Mesangial IgA disease [25]

Although there is no known effective treatment for IgA nephropathy, there have been reports of favourable response to long term corticosteroid therapy. 80% adults with minimal change GN will respond to steroids, although remissions can take up to 16 weeks. Membranous GN does not respond to steroid treatment. No specific treatment is available to cause regression of amyloid deposits.

33- Which of the following is true concerning a 68 year old male with type 2 diabetes diagnosed with type IV renal tubal acidosis?

- 1) Aminoaciduria would be expected. [0]
- 2) Fludrocortisone treatment is effective [100]
- 3) Increased Glomerular filtration rate is expected. [0]
- 4) Increased urinary bicarbonate would be expected. [0]
- 5) Normal renal handling of K⁺ and H⁺ [0]

H⁺ secretion, sodium reabsorption and ammonia production diminishes. RTA 4 is in effect hyporeninaemic hypoaldosteronism or failure of aldosterone action and thus helped treated with mineralocorticoids. It is usually seen in chronic renal disease and hence low GFR and particularly. Aminoaciduria and increased urine bicarbonate are features of RTA types 1 and 2.

34- Which of the following is least likely with the HLA complex?

- 1) Class I products recognised by CD8 [0]
- 2) Class II products used to activate CD4 [0]
- 3) polymorphism in Class I genes, but not Class II [100]
- 4) multiple sclerosis associated with HLA DR2 [0]
- 5) HLA matching more important in kidney/pancreas transplant than liver transplant [0]

Liver allografts are less immunogenic than the kidney. Polymorphism in both Class I and II genes. Helper T cells divided into 2, depending on cytokines released - Th1 (IL-2 and interferon- γ) and Th2 (IL-4, -5, -10).

35- The following are features of pseudohypoparathyroidism:

- 1) Increased urinary phosphate and cAMP with PTH infusion [0]
- 2) Low serum PTH [0]
- 3) Low serum calcium and low serum phosphate [0]
- 4) Low serum calcium and high serum phosphate [100]
- 5) Shortened 2nd and 3rd metacarpals [0]

The biochemistry shows a hypocalcaemia with hyperphosphataemia being usual but elevated PTH due to resistance to parathormone (PTH). This is due to mutation of the PTH receptor with abnormality of the G α subunit with reduced cAMP production following a PTH infusion. There are associated phenotypic signs including short stature, low IQ and shortened 4th and 5th metacarpals.

36- A 60-year-old man was diagnosed last year with adenocarcinoma of the lung, and a 4 cm mass lesion was treated with a right lower lobectomy. He now has an abdominal CT scan that reveals scattered hepatic mass lesions and hilar lymphadenopathy. For several weeks, he has had increasing malaise. A urinalysis reveals marked proteinuria, and a 24 hour urine protein collection is 2.7 g/24hr. His serum urea is 30 mmol/L (2.5 - 7.5) with creatinine of 450 µmol/L (60 - 110). A renal biopsy is performed, and there is focal deposition of IgG and C3 with a granular pattern. He is most likely to have which of the following conditions?

- 1) Goodpasture's syndrome [0]
- 2) Membranous glomerulonephritis [100]
- 3) Minimal change glomerulonephritis [0]
- 4) Nodular glomerulosclerosis [0]
- 5) Rapidly progressive glomerulonephritis [0]

Most cases of membranous GN are idiopathic, but in some patients there is a history of an infection or a malignancy (usually lung) with antigenemia.

37- Erythropoietin therapy causes

- 1) Benign intracranial hypertension [0]
- 2) Myositis [0]
- 3) Hypotension [0]
- 4) Seizures [100]
- 5) Osteoporosis [0]

Hypertension is a frequent problem and may induce seizures. A particular symptom is the onset of sudden stabbing migraine-like headache and should raise awareness to the possibility of hypertensive crisis. Other adverse effects of treatment with erythropoietin include hyperkalaemia in uraemic patients, increased PCV (especially with misuse by normal individuals), thrombocythaemia, shunt thrombosis, induction of iron deficiency, skin rashes, urticaria and flu-like illness.

38- Which of the following is a feature of cystinuria?

- 1) accumulation of cystine in the kidney [0]
- 2) a useful response to acidification of urine [0]
- 3) autosomal dominant inheritance [0]
- 4) excessive urinary arginine excretion [100]
- 5) radiolucent urinary calculi [0]

Cystinuria is the commonest inborn error of amino acid transport. Amino acids excreted in urine are cystine, ornithine, arginine and lysine (mnemonic - COAL). The renal stones are radio-opaque due to the presence of sulphur. It is inherited as an autosomal recessive condition. Management includes alkalinization along with high fluid intake (>4 L/day); d-penicillamine may also be used.

It is cystinosis that leads to accumulation of cystine in the kidney.

39- A 19-year-old female developed pleural effusions, ascites and ankle swelling. Her blood pressure was 112/76 mmHg.

Investigations revealed:

serum alanine transferase 17 U/L (5 - 15)
serum total bilirubin 17 umol/L (1 - 22)
serum albumin 21 g/L (34 - 94)
serum total cholesterol 9.8 mmol/L (<5.2)

What is the next most appropriate investigation?

- 1) Antinuclear antibody [0]
- 2) Pregnancy test [0]
- 3) Prothrombin time [0]
- 4) Serum protein electrophoresis [0]
- 5) Urinary protein estimation [100]

The low albumin and elevated cholesterol would suggest nephrotic syndrome (>4gram protein/24hour urine). Other complications of nephritic syndrome include susceptibility to infection, thromboses, renal failure and protein malnutrition. The normal BP makes preeclampsia unlikely. Besides, the hypercholesterolaemia is the big clue.

40- A 15-year-old girl was seen by her family physician because of increasing lethargy. She had a recent history of the "flu". Biochemistry tests show that she has renal impairment.

serum sodium 140 mmol/L (137 - 144)
serum potassium 4.2 mmol/L (3.5 - 4.9)
serum urea 28 mmol/L (2.5 - 7.5)
serum creatinine 280 µmol/L (60 - 110)

Her condition does not improve after several weeks on corticosteroid therapy, so a renal biopsy is performed. The biopsy demonstrates the presence of segmental sclerosis of 3 of 10 glomeruli identified in the biopsy specimen. Immunofluorescence studies and electron microscopy do not reveal evidence for immune deposits. What is the most appropriate advice to give regarding her condition?

- 1) She has an underlying malignancy [0]
- 2) She may require a renal transplant in 10 years [100]
- 3) She will improve if she loses weight [0]
- 4) She will likely develop a restrictive lung disease [0]
- 5) She will probably improve with additional corticosteroid therapy [0]

The findings point to focal segmental glomerulosclerosis (FSGS), which leads to chronic renal failure in half of cases. The lack of resolution with corticosteroid therapy and the progression to chronic renal failure is what sets FSGS apart from minimal change disease.

41- Which ONE of the following is true concerning Antidiuretic hormone (ADH)?

- 1) Carbamazepine potentiates its release [100]
- 2) Ethanol potentiates its release [0]
- 3) It circulates in the blood bound to neurohypophysin [0]
- 4) It is a cyclic octapeptide [0]
- 5) It is synthesised in the posterior pituitary [0]

ADH is a nonapeptide manufactured in the paraventricular and supra-optic nuclei of the hypothalamus and released from the posterior pituitary. It acts on the collecting ducts improving water permeability and hence water retention. Carbamazepine as well as other agents such as thiazides and SSRIs may potentiate its release. Ethanol usually inhibits release.

Neurology

1- A 23-year-old man presents with visual loss in the right eye, diagnosed as optic neuritis.

Which one of the following statements would be seen in an afferent pupillary defect?

- 1) accommodation response is unaffected [100]
- 2) hypersensitive response to pilocarpine in the affected eye [0]
- 3) irregular pupil of the affected eye [0]
- 4) pupil of affected eye larger than the unaffected eye [0]
- 5) pupil of affected eye smaller than the unaffected eye [0]

Optic neuropathy DOES NOT cause any abnormalities of the shape or size of the pupil. However the light reaction is diminished. Accommodation is normal.

2- A 75-year-old man presents with 12 months history of cognitive impairment, parkinsonism, intermittent confusion and generalised myoclonus. He was started on 62.5 tds of sinemet. In the following 2 months he was started experiencing visual hallucinations. The most likely diagnosis is:

- 1) Idiopathic Parkinson's disease [0]
- 2) Alzheimer's disease [0]
- 3) Diffuse Lewy body disease [100]
- 4) Multiple system atrophy [0]
- 5) Progressive supranuclear palsy [0]

Diffuse lewy body disease presents with cognitive impairment, visual hallucinations, intermittent confusion, parkinsonism, myoclonus and marked sensitivity to neuroleptic treatment. Visual hallucinations in parkinson's disease treated with L-dopa usually appear late (>2 years after initiation of treatment). Visual hallucinations are not features of multiple system atrophy or progressive supranuclear palsy.

3- Which visual field defect is most likely to occur with multiple sclerosis?

- 1) bitemporal hemianopia [0]
- 2) central scotoma [100]
- 3) homonymous hemianopia [0]
- 4) increased blind spot [0]

5) tunnel vision [0]

Central scotoma likely with retrobulbar neuritis and optic atrophy. Tunnel vision occurs in glaucoma, retinitis pigmentosa and retinal panphotocoagulation. Increased blind spot occurs with papilloedema, which may lead to optic atrophy. Optic chiasma compression causes bitemporal hemianopia.

4- Which is true of herpes simplex encephalitis?

- 1) brain MRI is characteristically normal [0]
- 2) fits are uncommon [0]
- 3) genital herpes is usually present [0]
- 4) temporal lobe involvement is common [100]
- 5) viral identification using polymerase chain reaction on CSF is non-specific [0]

Herpes simplex encephalitis (HSE) is associated with high signal in one or both temporal lobes (limbic encephalitis). Seizures are commonly present in HSE. Herpes Simplex Virus type 1 is the causative virus (Not type 2 which is associated with genital herpes). PCR for herpes simplex virus on CSF is highly specific test.

5- Which of the following investigations best supports a diagnosis of new variant CJD:

- 1) CSF analysis [0]
- 2) CT brain [0]
- 3) EEG [0]
- 4) EMG [0]
- 5) MRI brain [100]

MRI brain typically shows bilateral posterior thalamic high signal abnormalities in patient with new variant CJD. EEG , CSF analysis only shows non-specific changes. EMG and CT brain are normal. Sporadic CJD (and not new variant CJD) is associated with specific EEG changes.

6- Which of the following is a recognised cause of a phrenic nerve palsy?

- 1) Aortic aneurysm [100]
- 2) Dermoid [0]
- 3) Ganglioneuroma [0]
- 4) Pericardial cyst [0]
- 5) Sarcoidosis [0]

The diaphragm is innervated by the phrenic nerve (C3,4,5). Palsy is a recognised complication of thoracic surgery, infection, Guillain-Barre or invasion by an adjacent tumour. It may also be stretched by an aortic aneurysm.

7- A 33 year old epileptic female presents with visual problems. Examination reveals a constriction of visual fields to confrontation. Which of the following may be responsible for her visual deterioration?

- 1) Vigabatrin [100]
- 2) Lamotrigine [0]
- 3) Gabapentin [0]
- 4) Phenytoin [0]
- 5) Sodium Valproate [0]

Vigabatrin is associated with constricted visual fields and when detected therapy should be stopped.

8- A 19 year old girl presents at the antenatal clinic. She is approximately six weeks pregnant and the pregnancy was unplanned. She has a two year history of grand mal epilepsy for which she takes carbamazepine. She has had no fits for approximately six months. She wants to continue with her pregnancy if it is safe to do so. She is worried about her anticonvulsant therapy and the effects on the baby and enquires how she should be managed?

- 1) Advise termination due to drug teratogenicity [0]
- 2) Continue with carbamazepine [100]
- 3) Stop carbamazepine until the second trimester [0]
- 4) Switch therapy to phenytoin [0]
- 5) Switch therapy to sodium valproate [0]

The patient and fetus are at far more risk from uncontrolled seizures than from any potential teratogenic effect of the therapy. In pregnancy total plasma concentrations of anticonvulsants fall and so the dose may need to be increased. The potential teratogenic effects (particularly neural tube defects) of carbamazepine do need to be explained and in an effort to reduce this risk she should receive folate supplements. Screening with AFP and second trimester ultrasound are required. Vitamin K should be given to the mother prior to delivery. There is no point in switching therapies as this could precipitate seizures in an otherwise stable patient. Similarly, both phenytoin and valproate are again associated with teratogenic effects. (Further reading: Epilepsy in pregnancy)

<http://members.tripod.com/kinsei78/preg.htm>

9- A female patient aged 30 has a 5 years history of difficulty getting upstairs and out of a low chair and mild upper limb weakness but no pain. There is no family history. She presented with severe type 2 respiratory failure. EMG showed evidence of myopathy. The most likely diagnosis is:

- 1) Polymyositis [0]
- 2) Inclusion body myositis [0]
- 3) Acid Maltase Deficiency [100]
- 4) Miller-Fisher Syndrome [0]
- 5) Lambert-Eaton Myasthenic Syndrome [0]

Acid maltase deficiency typically presents with insidious onset of proximal myopathy and early respiratory muscle weakness. Respiratory failure in inflammatory myopathies (polymyositis, dermatomyositis, inclusion body myositis) and limb girdle muscular dystrophy is rare. Muscle biopsy shows vacuolation in muscle fibres.

Miller-Fisher Syndrome, a variant of GBS, is characterised by ophthalmoplegia, ataxia and areflexia. Lambert-Eaton Myasthenic Syndrome, often a paraneoplastic phenomenon, is associated with hyporeflexia which returns after exercise, autonomic symptoms and fatigability.

10- A 75 year-old woman with acute monocular visual loss. Fundoscopy reveals a swollen pale optic disc in the affected eye. What is the most likely diagnosis?

- 1) Central retinal vein occlusion. [0]
- 2) Closed angle glaucoma. [0]
- 3) Giant cell arteritis. [100]
- 4) Optic neuritis. [0]
- 5) Raised intracranial pressure. [0]

The presence of a swollen optic disc suggests ischaemic optic neuropathy. In elderly people Giant cell arteritis is a common presentation of acute monocular visual loss. Optic neuritis is very rare in people over the age of 50. You will expect bilateral swollen optic discs in raised intracranial pressure. In central retinal vein occlusion you will expect diffuse retinal haemorrhages.

11- A 45-year-old man presents with an insidious onset of binocular horizontal diplopia and left sided facial pain. On examination he has a left abducens nerve palsy and numbness over the maxillary division of the left trigeminal nerve. The most likely anatomical site of his neurological lesion is:

- 1) Cavernous sinus [0]
- 2) Petrous apex [100]
- 3) Superior orbital fissure [0]
- 4) Cerebellopontine angle [0]
- 5) Midbrain [0]

In the pre-antibiotic era an abducens nerve palsy with ipsilateral pain and numbness was due to petrous osteitis (Gradenigo syndrome) but is now more likely the result of a meningioma or nasopharyngeal carcinoma of the petrous apex. The cavernous sinus syndrome consists of variable involvement of: oculomotor, trochlear, abducens, trigeminal (ophthalmic and maxillary division) and oculo-sympathetic nerves. The superior orbital fissure syndrome is similar to the cavernous sinus syndrome except for the presence of proptosis.

12- An adolescent boy presents with unexplained neurological illness. Which one of the following would suggest substance abuse?

- 1) A history of low self-esteem. [0]
- 2) A history of social isolation. [0]
- 3) Deposits around the mouth. [100]
- 4) A history of family conflict. [0]
- 5) A history of attention deficit disorder. [0]

An increasing number of adolescents are experimenting with alcohol, drugs and solvents, usually soon after entering secondary school. Unfortunately, this includes a

rising number of young girls smoking. Factors associated with drug use include low self-esteem, social isolation, depression, family conflicts and other conduct disorders. Presentations suggestive of substance abuse include altered behaviour, sniffer's rash, injection sites, chronic upper respiratory tract infection, irregular pulse, glue stains on the skin or clothes, and acute intoxication \pm ataxia, coma, respiratory depression and cardiac arrhythmia. The only specific thing indicating substance abuse in this case is, therefore, the deposits presumably of glue around the mouth. Sniffer's rash consists of inflammation and ulceration around the mouth and nose.

13- A 45-year-old woman noticed tinnitus in her left ear which progressed over some weeks to hearing loss in that ear. On physical examination she is found to have a marked decrease in hearing on the left, with Rinne test indicating air conduction better than bone conduction. The other cranial nerves I - VII and IX - XII are intact. A brain MRI scan revealed a solitary, fairly discrete, 3 cm mass located in the region of the left cerebellopontine angle. Which of the following statements is most appropriate to tell the patient regarding these findings?

- 1) A test for HIV-1 is likely to be positive [0]
- 2) Other family members should undergo MR imaging of the brain [0]
- 3) Remissions and exacerbations are likely to occur in coming years [0]
- 4) The lesion can be resected with a good prognosis [100]
- 5) You are unlikely to survive for more than a year [0]

These acoustic neuromas are benign neoplasms. A solitary mass is unlikely to be part of neurofibromatosis (which could be familial).

14- A 22-year-old man suffers a deep laceration to the forearm resulting in transection of the median nerve. Following this injury, the nerve will undergo which of the following pathological processes?

- 1) Chronic inflammation [0]
- 2) Coagulative necrosis [0]
- 3) Fibrinoid necrosis [0]
- 4) Segmental demyelination [0]
- 5) Wallerian degeneration [100]

Degeneration of the portion of the nerve distal to the injury. Segmental demyelination is a feature seen in axons in the central nervous system with multiple sclerosis.

15- Which of the following features is characteristic of myasthenia gravis?

- 1) Diplopia [100]
- 2) Equal sex incidence [0]
- 3) Fasciculation [0]
- 4) Lid lag [0]
- 5) Loss of pupillary reflexes [0]

Myasthenia gravis is commoner in females (it is an autoimmune disease). The commonest features include ptosis, diplopia and ophthalmoplegia. It is a neuromuscular disorder and therefore does not cause any lower motor neuron signs

such as fasciculations, wasting, and loss of reflexes. Pupils are always normal. Lid lag is a feature of thyroid eye disease.

16- A 25-year-old woman presents with a severe migraine. Which of the following is not a recognised feature of migraine?

- 1) Some symptoms improved by tricyclic antidepressants [0]
- 2) Third nerve palsy [0]
- 3) External ophthalmoplegia [100]
- 4) bilateral fortification spectra [0]
- 5) precipitation by oral contraceptives [0]

Fortification spectra (jagged lines resembling battlements) and teichopsia (flashes) are common. Tricyclics can be useful for nausea.

Chronic progressive external ophthalmoplegia usually develops in childhood and is associated with ptosis, fatigue and limitation to eye- movements in all directions. The disorder is in the cytochromes.

17- A 48-year-old female patient develops an acute, severe and isolated right C6 radiculopathy affecting both the motor and sensory roots. She is examined in an EMG clinic 3 weeks after the onset of symptoms.

Which of the following statements is true?

- 1) Absent sensory nerve potentials would be expected on examination of the thumb and index finger on the right. [100]
- 2) A repeat examination 12 months later is likely to reveal rapidly recruited low amplitude short duration motor units in the clinically involved muscle on EMG. [0]
- 3) Fibrillation potentials would be expected in the right brachioradialis and abductor pollicis brevis. [0]
- 4) Triceps tendon jerk is likely to be depressed or absent. [0]
- 5) Voluntary motor unit activity may be absent in the right biceps. [0]

A difficult question. Thumb and index finger are within the C6 dermatome.

Abductor Pollicis Brevis and brachioradialis are supplied by C8/T1. Fibres from C7/8 are responsible for the triceps reflex. A pattern of rapidly recruited low amplitude short duration motor units on the EMG would be considered to represent myopathic changes rather than de-innervation.

18 - A 15 year old boy presents with tremor of both hands. Over the previous months he has developed a mild dysarthria. He has a history of behavioural problems, of a depressive/psychotic nature. The most likely diagnosis is:

- 1) Alzheimer's disease [0]
 - 2) Huntington's disease [0]
 - 3) Neuroacanthocytosis [0]
 - 4) variant Creutzfeldt-Jakob disease [0]
 - 5) Wilson's disease [100]
-

Wilson's disease is a rare disorder of copper metabolism which is inherited as an autosomal recessive disease. It is associated with extrapyramidal features (tremor, parkinsonism, dystonia), dysarthria, psychiatric features, cirrhosis and a deposit of brownish-green pigment around the margin of the cornea (Kayser-Fleischer ring). Variant Creutzfeldt-Jakob disease is characterised by myoclonus and rapid onset dementia.

19- A 24 year old female presents with vague frontal headaches and visual disturbance. She has a past history of acne for which she is receiving treatment. Examination reveals her to be obese with a blood pressure of 110/70 mmHg. There is absence of the central retinal vein pulsation on fundoscopic examination. Which of the following drugs account for these findings?

- 1) Isotretinoin [0]
- 2) Ampicillin [0]
- 3) Topical tetracycline [0]
- 4) Dianette [100]
- 5) Erythromycin [0]

Dianette, like any oral contraceptive may be associated with Benign Intracranial Hypertension. Topical tetracycline is not associated with BIH. Rarely BIH has been associated with isotretinoin but usually in combination with a tetracycline.

20- Which of the following is true of human neurons?

- 1) myelin sheaths extend across the nodes of Ranvier. [0]
- 2) unmyelinated fibres have faster conduction. [0]
- 3) sodium ion influx occurs during the action potential. [100]
- 4) the action potential increases with increased stimulation. [0]
- 5) increased extracellular calcium leads to increased neuronal excitability. [0]

Myelin sheaths are interrupted by the nodes of Ranvier allowing depolarization to jump from one node to another and increase conduction velocity. This is called saltatory conduction and it allows a more than 50-fold increase in conduction speed in myelinated fibres. The action potential occurs as a result of sodium ion influx and potassium efflux from the neuron and is an 'all or none' phenomenon. Decreased extracellular calcium concentration leads to a lowering of the threshold for neuronal depolarization and thereby increases nerve cell excitability. From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 173 © WB Saunders. Reproduced with permission.

21- A 34 year old male presents with back-pain and weakness. Which of the following would support a diagnosis of prolapsed intervertebral disc?

- 1) bilateral symmetrical nerve involvement [0]
 - 2) Loss of sensation over the left outer upper thigh [100]
 - 3) no evidence of nerve compression [0]
 - 4) pain which is worse on resting [0]
 - 5) pain which is unremitting in character [0]
-

Prolapsed intervertebral disc is associated with pain and neurological loss in one nerve root. Frequently roots of the sciatic nerve are affected. Compression of more than one root suggests an alternative diagnosis. Pain at rest would suggest an alternative diagnosis such as infection, tumour or metabolic disease as would unremitting pain.

22- The anticonvulsant Levetiracetam

- 1) Is used as monotherapy for the treatment of generalised convulsions [0]
- 2) Acts via the GABA receptor [0]
- 3) Is associated with induction of hepatic cytochrome p450 enzymes [0]
- 4) Is well absorbed via the oral route [100]
- 5) Is associated with increased plasma concentrations of sodium valproate [0]

Levetiracetam (Keppra) is an adjunctive treatment for partial seizures with or without secondary generalisation. Its mechanism of action is unknown. It is rapidly absorbed orally, it does not effect hepatic enzymes but dose reduction is required in renal failure. The drug appears to be well tolerated with few side effects.

23- Following factors decrease large intestinal motility:

- 1) Parasympathetic activity [0]
- 2) Anticholinergic agents [100]
- 3) Gastric Distension [0]
- 4) CCK-PZ [0]
- 5) Laxatives. [0]

The others and cholinergic agents increase large intestinal motility.

24- A 72 year old female presents with general slowness. Examination reveals a tremor of the hands. What frequency of tremor would you suspect in Parkinson's disease?

- 1) 1 Hz [0]
- 2) 2 Hz [0]
- 3) 5 Hz [100]
- 4) 8 Hz [0]
- 5) 10 Hz [0]

The typical tremor associated with Parkinson's disease is 4-6 Hz although in a minority the tremor may be faster - 8 Hz. This rate is more typical of essential tremor.

25- Which statement is true regarding Gabapentin?

- 1) is a potent hepatic enzyme inducer [0]
- 2) side effects typically include visual field defects with long-term use [0]
- 3) therapy is best monitored through measuring plasma concentrations [0]
- 4) is of particular value as monotherapy in absence attacks (petit mal) [0]
- 5) requires dose adjustment in renal disease [100]

Gabapentin does not induce cytochrome P450 unlike other anticonvulsants such as phenytoin and phenobarbitone. Vigabatrin may cause visual field defects, which may be irreversible. Rarely have visual disturbances been associated with gabapentin. No use in Petit Mal and is used for add-on therapy in partial or generalised seizures.

26- A 62-year-old man presented with difficult walking. He had a past history of diabetes mellitus and cervical spondylosis, which had required surgical decompression eight years previously. He drank 40 units of alcohol weekly. On examination there was fasciculation, wasting and weakness in the left deltoid and biceps, with weakness in the shoulder girdle muscles bilaterally. There was fasciculation in the glutei and quadriceps bilaterally, weakness of hip flexion and foot dorsiflexion, brisk reflexes in upper and lower limbs, and extensor plantar responses. There was no sensory impairment.

What is the diagnosis?

- 1) alcoholic myopathy [0]
- 2) diabetic amyotrophy [0]
- 3) motor neurone disease [100]
- 4) recurrent cervical cord compression [0]
- 5) syringomyelia [0]

There are signs of lower (wasting, fasciculations) and upper (brisk reflexes, extensor plantar response) motor neuron involvement in the presence of normal sensation. Motor neuron disease is the commonest cause of such presentation. Alcoholic myopathy and diabetic amyotrophy do not share upper motor neuron signs. Syringomyelia presents with sensory symptoms and signs (spinothalamic). You expect sensory involvement with cervical cord compression.

27- Which of the following is least likely to cause choreiform movements?

- 1) polyarteritis nodosa [100]
- 2) polycythaemia rubra vera [0]
- 3) Rheumatic fever [0]
- 4) systemic lupus erythematosus [0]
- 5) thyrotoxicosis [0]

PAN affects medium sized arteries and usually involves peripheral nerves, bowel and rarely lungs. Other causes of chorea are Huntingdon's chorea, rheumatic fever and senile chorea.

28- A 24-year-old man presents with a five month history of low back pain, radiating to his buttocks, and back stiffness worse in the morning and worse after periods of inactivity. Which of the following signs is the most likely to be present?

- 1) exaggerated lumbar lordosis [0]
- 2) positive femoral stretch test [0]
- 3) positive Trendelenburg test [0]
- 4) restricted straight leg raising [0]
- 5) sacroiliac joint tenderness [100]

Common presentation of ankylosing spondylitis. Stiffness first thing in the morning and after inactivity, lower back pain radiating into the buttocks.

29- A previously well 27-year-old woman presents with a history of transient ischaemic attack affecting her right side and speech. She had returned to the United Kingdom from a holiday in New Zealand two days previously. On examination there was nothing abnormal to find. An ECG, chest X-ray, CT brain scan and routine haematology and biochemistry were all normal. What is the most likely underlying abnormality?

- 1) atrial myxoma [0]
- 2) carotid artery stenosis [0]
- 3) embolus from paroxysmal atrial fibrillation [0]
- 4) patent foramen ovale [100]
- 5) subarachnoid haemorrhage [0]

This is a typical cause of stroke in a young person due to prolonged immobility. Deep vein thrombosis with patent foramen ovale will cause paradoxical embolism and stroke.

30- Which of the following factors is the most likely to account for this problem?

- 1) altered volume of distribution [0]
- 2) delayed gastric emptying [100]
- 3) first pass metabolism [0]
- 4) hepatic enzyme induction [0]
- 5) reduced gut blood flow [0]

Paracetamol absorption is reduced during migraine attacks and reduced absorption is associated with increased nausea. There is evidence that delayed gastric emptying is to blame. (Tokola RA, Neuvonen PJ. Effect of migraine attacks on paracetamol absorption. Br J Clin Pharmacol 1984 Dec;18(6):867-71). In fact the paracetamol absorption technique is used to study gastric emptying.
<http://link.springer-ny.com/link/service/journals/00535/bibs/8033006/80330785.htm>

Enzyme induction with cigarette smoking does affect paracetamol metabolism. Its importance however, is in toxicity. Smokers would be classified as in a high risk paracetamol overdose and are assessed using a different time - paracetamol level curve.

31- A 25-year-old female presents with 2 days history of diplopia and unsteadiness. 2 weeks ago she suffered an upper respiratory tract infection. On examination there is complete ophthalmoplegia, areflexia and gait ataxia. Which of the following blood tests is the most likely to confirm the underlying diagnosis?

- 1) Acetylcholine receptors antibodies [0]
- 2) Anti GM1 antibodies [0]
- 3) Anti GQ1b antibodies [100]
- 4) Anti Hu antibodies [0]
- 5) Anti purkinje cell antibodies [0]

The most likely diagnosis is Miller Fisher syndrome (variant of Guillain Barre syndrome). It consists of complete or partial ophthalmoplegia, areflexia and ataxia. It usually follows antecedent infections. Serum IgG antibody to the ganglioside GQ1b is present in more than 95% of patients. It is highly specific for the syndrome.

Elevated levels of antibodies to the glycolipid ganglioside-monosialic acid (GM1 antibodies) have been shown, in some instances, to be associated with certain neurological disorders: lower motor neuron syndromes, amyotrophic lateral sclerosis, multiple sclerosis, other multifocal neuropathies, and systemic lupus erythematosus (SLE) with central nervous system involvement.

Neuronal Nuclear (Hu) Antibodies (NNA) are found in a number of paraneoplastic syndromes, including subacute sensory neuronopathy, paraneoplastic encephalomyelitis and paraneoplastic cerebellar degeneration and are associated with small cell lung carcinoma.

Purkinje cell cytoplasmic antibodies are useful for identifying individuals with subacute cerebellar degeneration or peripheral neuropathy due to a remote (autoimmune) effect of gynecologic or breast carcinoma.

32- Which of the following is true of tetanus?

- 1) failure to culture *Clostridium tetani* from the wound would make the diagnosis doubtful [0]
- 2) infection confers lifelong immunity [0]
- 3) there is a characteristic EEG [0]
- 4) *Clostridium*-specific intravenous immunoglobulin is of no benefit once spasm has started [0]
- 5) cephalic tetanus causes severe dysphagia [100]

a-absence of a wound does not exclude tetanus. b-patients need to be actively immunized after recovery. c-The toxin tetanospasmin doesn't cross the blood brain barrier, it diffuses through the blood to bind to receptors containing gangliosides on the neuronal membranes of presynaptic nerve terminals in muscles. The toxin does reach the brain by axonal transport. d-it is ineffective once the toxin is attached to nervous tissue but may prevent progression. e-Cephalic meaning involving the cranial nerves usually from a wound on the head and neck. May be confused with rabies but hydrophobia never occurs. (OTM, 3e, 7.11.20)

33- A 68-year-old man presents with progressive visual impairment. On examination there is an incongruous homonymous hemianopia. The most likely anatomical site of the neurological lesion is at:

- 1) optic nerve [0]
- 2) optic tract [100]
- 3) chiasma [0]
- 4) optic radiation [0]
- 5) occipital lobe [0]

Optic neuropathy causes a central scotoma, an optic tract lesion an incongruous homonymous hemianopia, a chiasmal lesion a bitemporal hemianopia, an optic radiation and occipital lobe lesion a congruous homonymous hemianopia.

34- A 21 year old female with epilepsy is well controlled on sodium valproate 600mg bd and had been taking oral contraceptives for three years. She presented to her general practitioner 12 weeks pregnant.

Which of the following is correct?

- 1) An alternative anticonvulsant should be used in place of sodium valproate [0]
- 2) Interaction of sodium valproate with the oral contraceptive increased the risk of pregnancy [0]
- 3) The dose of sodium valproate should be increased [0]
- 4) There is an increased risk of a neural tube defect in her fetus [100]
- 5) She is at increased risk of anaemia in pregnancy [0]

There is an increased risk of neural tube defects associated with anti-convulsants during pregnancy. However, the risks associated with treatment are outweighed by the benefits in preventing seizures, so the drug should be continued. The risks may be minimised through use of folate supplements. Sodium valproate is not an enzyme inducer and would not speed up metabolism of the pill.

35- A 40-year-old man has had decreased mentation with confusion as well as increasing incoordination and loss of movement in his right arm over the past 6 weeks. An MRI scan shows 0.5 to 1.5 cm lesions in cerebral hemispheres in white matter and at the grey-white junction that suggest demyelination. A stereotatic biopsy is performed, and immunohistochemical staining of the tissue reveals JC papovavirus in oligodendrocytes. Which of the following laboratory test findings is most likely to be associated with these findings?

- 1) CD4 lymphocyte count of 90/microliter [100]
- 2) Haemoglobin A1c of 9.8% [0]
- 3) HDL cholesterol of 0.7 mmol/L [0]
- 4) Oligoclonal bands in CSF [0]
- 5) Serum sodium of 110 mmol/L [0]

The findings are those of progressive multifocal leukoencephalopathy (PML), which is a condition that can develop in immunocompromised patients, such as those with AIDS. PML is associated with papova (JC) virus infection.

36- A 60-year-old man presents with an episode of memory loss. Three days earlier he had become confused. His wife led him into the house - he apparently sat down at her request, and had a cup of tea. He then wandered around the house, confused, but remained conscious and able to have some conversation with his wife, though continuing to ask similar questions repeatedly. After three hours, he abruptly returned to normal and had no recollection of the events. What is the most likely diagnosis?

- 1) alcohol related amnesia [0]
- 2) chronic subdural haematoma [0]
- 3) complex partial status epilepticus [0]

- 4) hysterical fugue state [0]
- 5) transient global amnesia [100]

This is the typical clinical description of transient global amnesia which represent a transient vascular insufficiency of both hippocampi.

37- A 65-year-old man presents with 4 months history of swallowing difficulties (worse with liquids than solids). He also complains of nasal regurgitation, coughing and choking episodes during meals and slight dysarthria. He lost 1 stone over the last 8 weeks. Which of the following investigations is the most appropriate for this case?

- 1) Gastroscopy [0]
- 2) Barium swallow [0]
- 3) CXR [0]
- 4) Tumour markers [0]
- 5) Acetyl choline receptors antibodies [100]

Nasal regurgitation, coughing and choking episodes during meals, dysphagia that is worse with liquids than solids and dysarthria indicate neurogenic dysphagia. Important causes at this age include myasthenia gravis and motor neuron disease. Mechanical dysphagia (e.g. oesophageal and gastric carcinoma, oesophageal stricture etc) causes dysphagia that is worse with solids than liquids. Nasal regurgitation and dysarthria are not accompanying features of mechanical dysphagia.

38 - A complete unilateral facial hemiparesis may be caused by which of the following?

- 1) An intracranial tumour [0]
- 2) Birth injury [100]
- 3) Cerebellar atrophy [0]
- 4) Myasthenia gravis [0]
- 5) Phenothiazine toxicity [0]

The facial nerve consists of 2 parts. The larger motor components supplies all the muscles of facial expression, while the smaller part (nervous intermedius) comprises the sensory and parasympathetic branches of taste from the anterior two thirds of the tongue, with efferent fibres to the lacrimal, submaxillary, and sublingual salivary glands. Unilateral upper motor neurone lesions (above the level of the pons) cause weakness more in the lower than in the upper part of the face, since upper facial structures receive bilateral innervation. A unilateral lower motor neurone lesion such as Bell's Palsy, affects the eyes as well. An intracranial tumour can, therefore, cause complete weakness only when both sides are affected. A forceps injury may compress the facial nerve.

39- Regarding pseudotumours cerebri (benign intracranial hypertension) which is true?

- 1) A mildly increased CSF cell count is typical. [0]
- 2) May be caused by prolonged steroid therapy. [100]
- 3) Is occasionally associated with focal neurological signs. [0]

- 4) Frequently presents with ataxia. [0]
5) Is distinguished from hydrocephalus by the absence of suture separation. [0]

Pseudotumour cerebri is a clinical syndrome that mimics brain tumours, and is characterised by raised intracranial pressure with normal CSF cell count and protein content, normal ventricular size, anatomy and position. Causes:

Metabolic disorders: galactosaemia, hypoparathyroidism, pseudohyperparathyroidism, hypophosphatasia, steroid therapy, hypervitaminosis A, vitamin A deficiency, Addison's Disease, obesity, menarche, oral contraceptives, pregnancy.

Infections: Roseola infantum, chronic otitis media, mastoiditis, Guillain Barré Syndrome. · Drugs: Nalidixic acid, tetracycline.

Haematological disorders: Polycythemia, haemolytic and iron deficiency anaemia, Wiskott Aldrich Syndrome.

Destruction of intracranial drainage by venous thrombosis: Lateral sinus or posterior sagittal sinus thrombosis, head injury, obstruction of the superior vena cava. It usually presents with headache and vomiting, though this is rarely as bad as that associated with posterior fossa tumour.

Diplopia is common due to 6th nerve palsy. Children are alert with no systemic upset. A bulging fontanelle, cracked pot sounds, or separation of the cranial sutures may be present. Papilloedema with an enlarged blind spot is the most consistent sign beyond infancy. Focal and neurological signs indicate a process other than pseudotumour cerebri. It may be complicated by optic atrophy and blindness. Most can be treated conservatively with monitoring of visual acuity. For others, multiple lumbar punctures may be necessary to reduce intracranial pressure. Very rarely are shunts required.

40- Which of the following associations is correct?

- 1) Renal transplantation and Non-Hodgkin's lymphoma [0]
2) Hepatitis B and aplastic anaemia [100]
3) Turner's syndrome and acute myeloid leukaemia [0]
4) Basophilia and chronic myeloid leukaemia [0]
5) Crohn's disease and TB [0]

Post-renal transplant complications include:

Renal: acute tubular necrosis, acute and chronic rejection, technical urological or urovascular problems, recurrence of the original renal disease, urinoma.

Drug toxicity (immunosuppressives, antibiotics).

Infection (particularly viral e.g. CMV, systemic), wound or urinary tract infection. Bleeding.

Pancreatitis, lymphocele, bowel obstruction. Aplastic anaemia may be acquired or congenital.

Congenital causes:

Fanconi anaemia, reticular dysgenesis, Schwachman-Diamond Syndrome, dyskeratosis congenita, familial aplastic anaemia, preleukaemias, myodysplasia, monosomy 7, non-haematological syndromes (Down's, Seckle, Dubowitz).

Acquired causes:

Idiopathic

Secondary:

Radiation, drugs and chemicals (either predictable or idiosyncratic).

Viruses: EBV, hepatitis, parvovirus, HIV.

Immunological diseases: eosinophilic fascitis, hypogammaglobulinaemia, thymoma.

Other: pregnancy, paroxysmal nocturnal haemoglobinuria, preleukaemia.

AML constitutes 20% of all childhood leukaemias, but is the predominant in the neonatal period. It has an increased incidence in Down's Syndrome, Fanconi anaemia, Diamond-Blackfan anaemia, Kostmann Syndrome and Bloom Syndrome. It also occurs in children treated for a previous leukaemia, with a peak incidence within 10 years of the initial malignancy. This may be related to alkylating agents, agents that inhibit DNA repair, or radiation therapy. CML is a clonal malignancy of the haematopoietic stem cell characterised by a specific location, the t(9;22) (q34;q1), known as the Philadelphia chromosome. This juxtaposition produces a fusion gene. CML is rare in children, accounting for only 3% of childhood leukaemia. In most cases there is no predisposing feature. The films shows elevated white cell counts (which may exceed 105 per mm³, with all forms of myeloid cells seen in the blood smear. Platelet count may be elevated, and the bone marrow is hypercellular.

Cytogenetic and molecular studies demonstrating the Philadelphia chromosome confirm the diagnosis. Currently, there is no evidence to link Crohn's disease with TB.

41- A demyelinating polyneuropathy is typically caused by:

- 1) Diabetes [0]
- 2) Excessive alcohol [0]
- 3) Hereditary motor-sensory neuropathy [100]
- 4) Renal failure [0]
- 5) Vitamin B12 deficiency [0]

The differential diagnosis of demyelinating neuropathy includes: hereditary motor-sensory neuropathy (Charcot-Marie Tooth disease), Refsum's Disease, Guillain-Barre syndrome, chronic inflammatory demyelinating polyneuropathy (CIDP), paraprotein-related disorder, leukodystrophies. Amiodarone, Diabetes, alcohol, Vitamin deficiencies and renal failure cause an axonal polyneuropathy.

42- Causes of dilated pupils include:

- 1) Argyll Robertson pupil [0]
- 2) Ethylene glycol poisoning [100]
- 3) Myotonic dystrophy [0]
- 4) Organophosphate poisoning [0]
- 5) Pontine haemorrhage [0]

Causes of dilated pupils include Holme's Adie (myotonic) pupil, third nerve palsy, drugs and poisons (atropine, CO, ethylene glycol). Causes of small pupils include Horner's syndrome, old age, pontine haemorrhage, Argyll Robertson pupil, drugs and poisons (opiates, organophosphates).

43- Which ONE of the following would be expected in a third nerve palsy?

- 1) Enophthalmos [0]
- 2) Constricted pupil [0]
- 3) Convergent strabismus [0]
- 4) Increased lacrimation [0]
- 5) Unreactive pupil to light [100]

There is typically ptosis with a dilated unreactive pupil. Enophthalmos is seen in Horner's syndrome. There would be a dilated not constricted pupil and a divergent squint - affected eye deviated 'down and out'. Increased lacrimation may be seen in VIIth palsy.

44- A 20-year-old female presents with acute onset of left foot drop. Examination reveals weakness of ankle dorsiflexion and eversion. There is a small area of sensory loss in the first web space. Reflexes were all present and plantar flexor. Which of the following nerves is likely to be involved?

- 1) Tibial nerve [0]
- 2) Common peroneal nerve [100]
- 3) Sciatic nerve [0]
- 4) Femoral nerve [0]
- 5) Inferior gluteal nerve [0]

Peroneal neuropathy usually presents with acute foot drop. The foot and ankle weakness on neurological examination is restricted to ankle and toe dorsiflexion and ankle eversion. Ankle reflex (Tibial nerve mediated) and knee reflex (Femoral nerve mediated) are intact. Sensory involvement may include the lower two thirds of the lateral leg and dorsum of foot.

45- Which of the following is a characteristic feature of transient global amnesia?

- 1) abnormal behaviour [0]
- 2) apraxia [0]
- 3) confabulation [0]
- 4) loss of personal identity [0]
- 5) normal perception [100]

Transient Global Amnesia is a syndrome in which a previously well person suddenly becomes confused and amnesic. The person appears bewildered and repeatedly asks questions about present and recent events e.g., "Where am I?" T.G.A. is characterised by the brain's sudden inability to form new memory traces (Anterograde amnesia) plus retrograde memory loss for events of the preceding days, weeks or in some cases years. During the attack, which affects both verbal and nonverbal memory, the patient is bewildered and anxious. Self identification is preserved. Behaviour is otherwise normal and appropriate. 'Characteristic' means that absence of the symptom would make you doubt the diagnosis. Presence of A, B, C or D would suggest an alternative diagnosis.

46- A lesion of the occipital lobe causes:

- 1) Acalculia [0]

- 2) Astereogenesis [0]
- 3) Constructional apraxia [0]
- 4) Cortical blindness [100]
- 5) Visuospatial neglect [0]

Lesions of the frontal lobe include difficulties with task sequencing and executive skills. Expressive aphasia (receptive aphasia is a temporal lobe lesion), primitive reflexes, perseveration (repeatedly asking the same question or performing the same task), anosmia and changes in personality. Lesions of the parietal lobe include apraxias, neglect, astereognosis (unable to recognise an object by feeling it) and visual field defects (typically homonymous inferior quadrantanopia). They may also cause acalculia (inability to perform mental arithmetic). Lesions of the temporal lobe cause visual field defects (typically homonymous superior quadrantanopia), Wernicke's (receptive) aphasia, auditory agnosia, and memory impairment. Occipital lobe lesions include cortical blindness (blindness due to damage to the visual cortex and may present as Anton syndrome where there is blindness but the patient is unaware or denies blindness), homonymous hemianopia, and visual agnosia (seeing but not perceiving objects - it is different to neglect since in agnosia the objects are seen and followed but cannot be named).

47- A 17-year-old man has been diagnosed with schizophrenia 4 weeks ago. He was started on haloperidol. Two weeks later he was found confused and drowsy. On examination he was pyrexial (40.7 C), rigid with blood pressure of 200/100. Which of the following treatment will you initiate?

- 1) phenytoin [0]
- 2) diazepam [0]
- 3) cefuroxime [0]
- 4) acyclovir [0]
- 5) dantrolene [100]

Neuroleptic malignant syndrome is the most likely diagnosis. Its major features are: rigidity, altered mental state, autonomic dysfunction, fever, and high creatinine kinase. It is usually caused by potent neuroleptics. The treatment of choice is dantrolene and bromocriptine. Withdrawal of neuroleptic treatment is mandatory. Rhabdomyolysis and acute renal failure are potential complications.

48- A 50 year-old male epileptic presents with paraesthesia of hands and feet. He also has unsteadiness when walking. On examination he has Dupuytren's contracture in his left hand, a peripheral sensory neuropathy and palpable lymph nodes in his neck and axillae.

Which of the following drugs is the most likely cause of these features?

- 1) Carbamazepine. [0]
- 2) Clonazepam [0]
- 3) Lamotrigine. [0]
- 4) Phenytoin. [100]
- 5) Sodium valproate. [0]

Phenytoin is well known to cause neurological side effects such as peripheral sensory neuropathy and cerebellar ataxia. Other side effects include gingival hypertrophy, lymphadenopathy hypocalcaemia, hirsutism.

49- An 80-year-old woman has a three month history of progressive numbness and unsteadiness of her gait. On examination, there is a mild spastic paraparesis, with brisk knee reflexes, ankle reflexes are present with reinforcement, extensor plantars, sensory loss in the legs with a sensory level at T10, impaired joint position sense in the toes, and loss of vibration sense below the iliac crests.

Investigations were as follows:-

haemoglobin 12.0 g/dl
MCV 99 fl

What is the most likely diagnosis?

- 1) anterior spinal artery occlusion [0]
- 2) dorsal meningioma [100]
- 3) multiple sclerosis [0]
- 4) subacute combined degeneration of the cord [0]
- 5) tabes dorsalis [0]

The presence of a sensory loss at T10 indicates a thoracic myelopathy. Subacute combined degeneration of the cord is unlikely as Hb and MCV are normal. Anterior spinal artery occlusion is unlikely as the history is progressive.

50- A 16 year old girl presented with a three week history of headache and horizontal diplopia on far right lateral gaze. On two separate occasions she noted dimmed vision whilst bending forwards. Over the last year she had gained 12 kilograms in weight. On examination, her weight was 95 kg, and height 162cms. Neurological examination revealed bilateral papilloedema and a partial right sixth cranial nerve palsy. What is the most likely diagnosis?

- 1) Benign intracranial hypertension. [100]
- 2) Multiple sclerosis. [0]
- 3) Pituitary tumour [0]
- 4) Superior sagittal vein thrombosis. [0]
- 5) Thyroid eye disease. [0]

This patient is markedly obese with a BMI of 36 and the history suggestive of BIH. Vision may be affected with enlargement of the blind spot and the visual obscuration with movements that provoke a rise in ICP (eg bending) is typical of BIH. Dysthyroid eye disease would not present like this and is more commonly associated with Hyperthyroidism. The papilloedema would argue against MS. A bitemporal hemianopia or a visual field defect would be expected with a pituitary tumour. Venous sinus thrombosis is a possibility but would be expected to produce deteriorating symptoms.

51- Which of the following clinical manifestations suggests Guillain Barré Syndrome?

- 1) Weakness beginning in the arms [0]
- 2) Asymmetrical involvement of distal muscles [0]
- 3) Bulbar involvement in about 50% of cases [100]
- 4) Brisk tendon reflexes [0]
- 5) Normal CSF protein [0]

GB is a post-infectious polyneuropathy causing demyelination in mainly motor but also sensory nerves. It usually follows a non-specific viral infection. Campylobacter and mycoplasma are recognised causes. Weakness begins in the legs and progressively ascends to involve the trunk, upper limbs and finally the bulbar muscles (Landry's ascending paralysis). Asymmetry is present in only 9% of patients, with symmetrical involvement being typical. Usually there is painless progression over days or weeks, but in cases of abrupt onset, there may be tenderness or muscle pain. Bulbar involvement occurs in 50%, with a risk of aspiration and respiratory insufficiency can be problematic. In the Miller Fisher Syndrome there is external ophthalmoplegia, ataxia and areflexia. In 20% of cases there is urinary incontinence or retention. Clinical symptoms usually improve within 2-3 weeks, though a chronic relapsing form is recognised. CSF protein is elevated to more than twice the upper limit of normal, with normal glucose and no pleocytosis. Bacterial cultures are negative and viral cultures rarely isolate anything. The dissociation between a high CSF protein and a lack of cellular response in a person with an acute or subacute polyneuropathy is diagnostic of Guillain Barré Syndrome

52- In herpes simplex encephalitis which of the following statements is correct?

- 1) brain MRI is characteristically normal [0]
- 2) temporal lobe involvement is common [100]
- 3) fits are uncommon [0]
- 4) cold sores or genital herpes are usually present [0]
- 5) viral identification by PCR on cerebrospinal fluid is non-specific [0]

MRI brain normally shows changes in the temporal lobes. Presenting features include fever, headache, vomiting, reduced consciousness and seizures. There may be dysphasia, hallucinations and peculiar behaviour. There are usually no skin manifestations of herpes simplex infections. The virus is rarely isolated from CSF but may be detected by PMR.

53- A 25 year-old lady recently diagnosed with rheumatoid arthritis. She has developed weakness, double vision and tiredness. Examination reveals bilateral weakness of eye abduction, bilateral ptosis, slightly reduced proximal motor power in the limbs, normal reflexes and sensation. What is the diagnosis?

- 1) Chronic progressive external ophthalmoplegia. [0]
- 2) Guillain-Barre syndrome. [0]
- 3) Multiple sclerosis. [0]
- 4) Myasthenia gravis. [100]
- 5) Polymyositis [0]

Myasthenia gravis is well known to be associated with other autoimmune diseases such as pernicious anaemia, thyroid disease and rheumatoid arthritis. In Guillain-Barre syndrome you will expect absent reflexes. Polymyositis does not usually cause ptosis or ophthalmoplegia.

54- A 63 year old male is admitted with acute onset unsteadiness of gait, dizziness and dysphagia. Examination revealed a right-sided Horner's syndrome, nystagmus, loss of pain and temperature sensation on the left side of the trunk and in the left arm and leg, and gait ataxia.

What is the most likely diagnosis?

- 1) leaking posterior communicating artery aneurysm [0]
- 2) left sided acoustic neuroma [0]
- 3) posterior inferior cerebellar artery occlusion [100]
- 4) right sided pontine infarct [0]
- 5) spontaneous left sided cerebellar haemorrhage [0]

This is Wallenberg's syndrome/ lateral medullary syndrome and is due to occlusion of the posterior inferior cerebellar artery.

55- Which of the following features are not compatible with the diagnosis of motor neuron disease?

- 1) Dementia [0]
- 2) Dysphagia [0]
- 3) Muscle cramps [0]
- 4) Neck weakness [0]
- 5) Optic atrophy [100]

10% of patients with MND have dementia (frontotemporal). Optic atrophy is not a feature of MND. Other features not compatible with the diagnosis are sensory impairment and bladder dysfunction.

56- A 35-year-old man has wrist drop of his right hand. Examination reveals a small area of sensory loss on the dorsum of the hand. Which of the following nerves is likely to be involved?

- 1) Median nerve [0]
- 2) Ulnar nerve [0]
- 3) Long thoracic nerve [0]
- 4) Radial nerve [100]
- 5) T1 nerve root [0]

This is a typical radial nerve palsy.

57- A 92-year-old man was admitted in a confused state. He has a history of immobility due to severe lower back pain. He had been losing weight for three months and had complains of weakness, urinary frequency, thirst, poor urinary stream

and constipation. Lumbar spine X-rays show severe osteopenia and collapse of the body of the vertebra at L3. Investigations show

haemoglobin 9.6 g/dl
sodium 144 mmol/l
potassium 3.9
urea 10.4
creatinine 120
glucose 8
dip stick urine blood ++, protein +

What is the most important immediate investigation?

- 1) Chest X-ray [0]
- 2) MSU [0]
- 3) prostate specific antigen [0]
- 4) serum calcium [100]
- 5) serum protein electrophoresis [0]

The likely underlying diagnosis is myeloma. The symptoms of constipation, weakness and thirst indicate hypercalcaemia. Serum calcium should be the IMMEDIATE investigation.

58- A 25-year-old old woman presents with 2 hrs of a unilateral temporal headache increasing in severity. The Pain is of a throbbing character and is exacerbated by light. There are no abnormal signs on examination. What is the diagnosis?

- 1) Acute Subarachnoid haemorrhage. [0]
- 2) Cluster headache. [0]
- 3) Intracranial Tumour. [0]
- 4) Migraine. [100]
- 5) Tension headaches. [0]

Migraine is the commonest cause of headache in young patients. Photophobia, unilateral presentation and normal examination will be consistent with migraine.

59- 50-year-old old man is admitted to hospital unconscious, and smelling of alcohol. One hour after admission, he becomes suddenly sweaty with a regular tachycardia of 110 bpm and a BP of 100/50. What is the diagnosis?

- 1) Alcohol withdrawal. [0]
- 2) Hepatic encephalopathy. [0]
- 3) Hypoglycaemia. [100]
- 4) Subdural haematoma. [0]
- 5) Wernicke's encephalopathy. [0]

This is a bit early for alcohol withdrawal particularly as the patient is admitted smelling of alcohol. The most likely diagnosis is hypoglycaemia. We do not have any clinical findings to suggest any of the other alternatives.

60- A 70-year-old man presents with weight loss, lower limb weakness and dry mouth. He has been a heavy smoker. On examination, he looks cachectic; he has proximal lower limb weakness, areflexia (reflexes normalise with repetitive muscle contraction). There is no wasting or fasciculations. Sensory examination is normal. Which of the following blood test is the most likely to confirm the diagnosis?

- 1) Acetylcholine receptors [0]
- 2) Voltage gated calcium channels antibodies [100]
- 3) Anti GM1 antibody [0]
- 4) Antinuclear antibody [0]
- 5) Anti Ro/La antibodies [0]

The most likely diagnosis is Lambert-Eaton syndrome. It results when IgG autoantibodies blockade the voltage-gated calcium channels of peripheral cholinergic nerve territory. 50% of the cases are associated with small cell lung carcinoma. Proximal lower limb weakness is the most consistent neurological feature. Ptosis and ophthalmoplegia are rare. Autonomic dysfunction is common (e.g. dry mouth). The reflexes are depressed or absent but normalise with repetitive muscle contraction.

61- 54 year old female is admitted with progressive weakness following a trivial flu-like illness. Which of the following would exclude Guillain-Barre Syndrome as the diagnosis?

- 1) Autonomic dysfunction [0]
- 2) Elevated protein on CSF examination [0]
- 3) Evidence of muscle wasting [0]
- 4) Ophthalmoplegia [0]
- 5) Sensory level below D1 [100]

GBS is a post-infectious acute polyneuritis typified by elevated CSF protein with few cells and often normal glucose. There is a profound weakness associated with areflexia and peripheral sensory neuropathy. Ophthalmoplegia is associated in particular with the Miller-Fisher variant. However, a sensory level is NOT a feature and would suggest cervical myelopathy. Muscle wasting is typical with prolonged illness. Autonomic disease may also feature. (Dr Jacob Easaw)

62- An 18 year old man presented with a history of a sudden onset of a frontal headache and photophobia. He had neck stiffness and a temperature of 38°C.

Which one of the following findings would suggest a diagnosis of subarachnoid haemorrhage rather than bacterial meningitis?

- 1) a blood neutrophil leucocytosis [0]
- 2) a family history of polycystic renal disease [100]
- 3) a fluctuating conscious level [0]
- 4) a history of diabetes mellitus [0]
- 5) a history of opiate abuse [0]

Fluctuating level of consciousness can occur in both meningitis and subarachnoid haemorrhage (SAH). Hypertension is a risk factor for SAH, but not diabetes. Opiate

abuse does not increase the risk for SAH. Cerebral aneurysm are associated with polystic kidney disease.

63- A 45-year-old man has a history of progressive weakness for 5 weeks. He had particular difficulty getting out of the bath. On examination there was severe truncal and proximal limb weakness, without wasting or fasciculation. Tendon reflexes, plantar and sensation were all normal. The vital capacity was 1.8L. What is the most likely diagnosis?

- 1) cervical myelitis [0]
- 2) Guillain-Barre syndrome [0]
- 3) polio [0]
- 4) polymyositis [100]
- 5) syringiobulbia [0]

The presentation of myopathy is characterised by proximal weakness with normal reflexes and sensation and the absence of fasciculations. Polymyositis is the commonest cause of inflammatory muscle disease in < 50 years old (inclusion body myositis is the commonest in >50 years old).

64- Which is true regarding cerebral palsy?

- 1) The incidence is 2 per 100 live births. [0]
- 2) Visual impairment occurs in 50%. [0]
- 3) Hearing loss is present in 5%. [0]
- 4) Epilepsy is present in 40%. [100]
- 5) Learning impairment is present in 30%. [0]

Cerebral palsy is a disorder of movement and posture due to a non-progressive lesion of the motor pathways in the developing brain. The clinical manifestations tend to evolve with age. The incidence is 2 per 1000 live births, and other problems are common and are reflecting more widespread damage to the brain. These include:

Learning impairment in 60%.

Epilepsy in 40%.

Squints in 30%.

Hearing loss and visual impairment in 20%.

Speech and language disorders.

In addition, there may be considerable behavioural problems.

65- A right carotid artery stenosis could not account for:

- 1) Contralateral hemiplegia [0]
- 2) Contralateral hemisensory loss [0]
- 3) Drop attacks [100]
- 4) Dysphasia [0]
- 5) Right amaurosis fugax [0]

Carotid artery disease causes contralateral hemiplegia, hemisensory loss, homonymous hemianopia, dysphasia (right) or hemineglect (left). Drop attacks are due to vertebrobasilar insufficiency.

66- Which of the following statements about the spinal cord is true?

- 1) A lesion of the left side of the spinal cord at C5 causes pyramidal weakness of the right leg [0]
- 2) Centrally placed spinal cord lesions affect joint position sense before other modalities of sensation [0]
- 3) Conus medullaris lesions characteristically cause mixed upper and lower motor neurone signs in the legs [0]
- 4) The spinal cord ends at the lower border of the L3 vertebra [0]
- 5) The spinothalamic tracts are supplied principally by the anterior spinal artery [100]

At the pyramidal decussation (lower medulla), 85% fibres cross over forming the lateral corticospinal tract and the remaining forming the ventral corticospinal tract, the fibres of which eventually cross the cord. Hence, a lesion at left side of C5 will cause weakness of the left leg.

Central spinal cord lesions destroy contiguous structures like the anterior horn cells (lower motor neurone signs), decussating sensory fibres (pain and temperature) and the lateral corticospinal tracts (upper motor neurone signs)

Conus medullaris lesion causes wasting and weakness of muscles (lower motor neurone signs) supplied by the lower sacral segments (glutei), with sensory loss of buttocks and perineum.

Spinal cord terminates at lower border of L1 vertebra.

Anterior spinal arteries supplies corticospinal and spinothalamic tracts, and anterior horns of the grey matter.

67- A 50-year-old man presented with 18 months history of parasthesiae of his feet and hands. On examination there is numbness of glove and stocking distribution with generalised hyporeflexia. Nerve conduction studies revealed demyelinating sensory polyneuropathy. Which of the following conditions is the most likely diagnosis?

- 1) Alcohol abuse [0]
- 2) Diabetes [0]
- 3) Chronic inflammatory demyelinating polyneuropathy [100]
- 4) Vasculitis [0]
- 5) Vitamin B12 deficiency [0]

Causes of demyelinating polyneuropathy includes: Guillain Barre syndrome, Chronic inflammatory demyelinating polyneuropathy (CIDP), paraproteinaemia, hereditary motor sensory neuropathy, Refsum's disease, HIV infection, Amiodarone. Alcohol abuse, diabetes, vasculitis and vitamin deficiencies are causes of axonal polyneuropathy.

68- Which of the following would be the result of a spinal lesion at the level of C8?

- 1) a reduced brachioradialis reflex [0]

- 2) inability to abduct the shoulder [0]
- 3) loss of sensation over the lateral aspect of the arm [0]
- 4) winging of the scapula [0]
- 5) weakness of finger flexion [100]

a - brachioradialis is the "supinator" reflex and it is mediated by C5/6 b - deltoid is supplied by C5/6 c - medial forearm and hand is affected. Lateral aspect of arm is C5 d - this is caused by paralysis of the long thoracic nerve to serratus anterior (C5,6,7)

69- Psychiatric illness rather than an organic brain disorder is suggested by:

- 1) Onset for the first time at the age of 55 years [0]
- 2) A family history of major psychiatric illness [100]
- 3) Impaired short term memory [0]
- 4) No previous history of psychiatric illness [0]
- 5) Clouding of consciousness [0]

B is especially associated with depressive illness. The rest all suggest an organic brain disorder.

70- A 27 year-old male presents with 3 months of difficulty walking. Examination reveals motor weakness of left leg in a pyramidal distribution with increase in tone. Impaired pinprick sensation of right leg extending into the groin. What is the cause of these signs?

- 1) A central cauda equina lesion. [0]
- 2) A cervical spinal cord lesion. [0]
- 3) A foramen magnum lesion. [0]
- 4) A left sided thoracic spinal cord lesion. [100]
- 5) Bilateral cerebral hemisphere lesions. [0]

The history suggests Brown-Sequard syndrome produced by a hemisection of the spinal cord. The clinical presentation is that of ipsilateral weakness and a loss of position and vibration below the lesion, with contralateral loss of pain and temperature.

71- Which of the following relate to Dopa-decarboxylase inhibitors?

- 1) enhance the effect of levodopa on the substantia nigra [0]
- 2) reduce the extracerebral complications of L-dopa therapy [100]
- 3) have anticholinergic activity [0]
- 4) should not be given in combination with dopamine agonists [0]
- 5) prevent L-dopa associated dyskinesias [0]

A – Dopa-decarboxylase inhibitors prevent the systemic metabolism of levodopa which leads to higher CNS levels. The effect itself is not enhanced only the concentration of available levodopa. B – these include nausea, vomiting, postural hypotension and cardiac arrhythmias. D – the combination makes dyskinesic movements more likely E - No. Dyskinesias are a CNS effect of levodopa.

72- Which of the following associations of muscles and nerve supply are NOT true:

- 1) Triceps and C7 [0]
- 2) Deltoid and C5 [0]
- 3) Gastrocnemius and S1 [0]
- 4) Quadriceps and L3 [0]
- 5) Long flexors of fingers and C6 [100]

Finger flexors and extensors are supplied by C8.

73- Which of the following would be expected following distal occlusion of the posterior cerebral artery?

- 1) cerebellar ataxia [0]
- 2) contralateral hemiplegia [0]
- 3) dysarthria [0]
- 4) homonymous hemianopia [100]
- 5) palatal palsy [0]

Distal (peripheral territory) posterior cerebral artery stroke, homonymous hemianopia (often upper quadrantic), cortical blindness, verbal dyslexia without agraphia, hemivisual neglect, visual hallucinations(Harrisons).

74- A young teenager presents with fever and headache. He has received oral Amoxycillin for 3 days. Which of the following CSF findings would exclude a partially treated meningitis?

- 1) Negative gram stain [0]
- 2) A CSF glucose of 45% of blood glucose [0]
- 3) A white cell count of 50 [100]
- 4) A negative CSF culture [0]
- 5) Negative Kernig's Sign [0]

The assessment of children with suspected bacterial meningitis who have already received antibiotic therapy is a diagnostic conundrum. This applies to about 25-50% of children, so it is an important problem. Partial treatment may reduce the incidence of positive CSF gram stains to <60%, and it also reduces the ability to grow the bacteria, particularly meningococcus. CSF glucose, protein, neutrophils and bacterial antigen testing or PCR should be completely unaffected.

75- A 52 year old man has a slurring of his speech. Examination reveals bilateral partial ptosis and frontal balding, and difficulty releasing his grip after shaking hands. What is the most likely diagnosis?

- 1) myasthenia gravis [0]
- 2) Eaton-Lambert syndrome [0]
- 3) Myotonia dystrophica [100]
- 4) Duchenne muscular dystrophy [0]
- 5) Myotonia congenita [0]

Myotonia dystrophica is autosomal dominant. Its features include ptosis, frontal balding, cataracts, cardiomyopathy, impaired intellect, testicular atrophy, diabetes mellitus and slurred speech (from tongue and pharyngeal myotonia). There is no treatment for weakness which is the main cause of disability, but phenytoin, quinine or procainamide may be useful for myotonia. Myotonia congenital (Thomsen's disease) is not associated with features of myotonia dystrophica apart from difficulty relaxing after forceful contraction.

76- A 43-year-old woman develops a progressive, ascending motor weakness over several days. She is hospitalized and requires intubation with mechanical ventilation. She is afebrile. A lumbar puncture is performed with normal opening pressure and yields clear, colorless CSF with normal glucose, increased protein, and cell count of 5/microliter, all lymphocytes. She gradually recovers over the next month. Which of the following conditions most likely preceded the onset of her illness?

- 1) Ketoacidosis [0]
- 2) Staphylococcus aureus septicemia [0]
- 3) Systemic lupus erythematosus [0]
- 4) Viral pneumonia [100]
- 5) Vitamin B12 deficiency [0]

She has Guillain-Barre syndrome often preceded by an episode of infection such as viral (CMV) or bacterial (Campylobacter).

77- A 19-year-old woman presents to the clinic having had 5 blackouts over the last year, all while she is standing up. She gets warnings of blurred vision, nausea, feeling hot. She had been witnessed twice to have jerking of all limbs while she is unconscious. The attacks last 30-60 seconds. She recovers quickly after the attacks. She has never bitten her tongue or sustained any injuries. Physical examination and an ECG are normal. Her grandmother and sister suffer from epilepsy. Which of the following investigations is the most appropriate?

- 1) EEG [0]
- 2) 24 hour ECG recording [0]
- 3) CT brain [0]
- 4) ECHO [0]
- 5) Tilt table test [100]

The most likely diagnosis is vasovagal syncope. The gradual onset of the attack is typical. It is common for patients with syncope to have jerking of their limbs while they are unconscious. Warning symptoms of darkening/blurring of vision, dizziness, feeling hot, is characteristic in syncope. Patients usually recover very quickly after the event. Tilt table test is a useful test to support the diagnosis of vasovagal syncope.

78- A 36 year-old man has a 3 month history of pain in feet and lower legs. He was diagnosed as having diabetes at age 14 and treated with insulin. He is a cannabis smoker and drinks 30 units of alcohol per week. On examination he has impaired pain and temperature sensation in feet and lower legs, normal joint position and vibration sense. His reflexes are normal. What is the diagnosis?

- 1) Alcoholic polyneuropathy. [0]

- 2) Chronic inflammatory demyelinating polyneuropathy (CIDP) [0]
- 3) Diabetic polyneuropathy. [100]
- 4) Syringomyelia. [0]
- 5) Vitamin B12 deficiency. [0]

The history suggests small fibre painful peripheral sensory neuropathy. The commonest cause is diabetes. Vitamin B12 deficiency causes impairment of joint position and vibration. Chronic inflammatory demyelinating polyneuropathy (CIDP) causes a large fibre peripheral neuropathy with areflexia. In syringomyelia you have impaired pain and temperature only in the upper limbs.

79- A lesion of the parietal lobe causes:

- 1) Bitemporal hemianopia [0]
- 2) Homonymous inferior quadrantanopia [100]
- 3) Perseveration [0]
- 4) Primitive reflexes [0]
- 5) Wernicke's (receptive) aphasia [0]

Lesions of the frontal lobe include difficulties with task sequencing and executive skills. Expressive aphasia (receptive aphasia is a temporal lobe lesion), primitive reflexes, perseveration (repeatedly asking the same question or performing the same task), anosmia and changes in personality. Lesions of the parietal lobe include apraxias, neglect, astereognosis (unable to recognise an object by feeling it) and visual field defects (typically homonymous inferior quadrantanopia). They may also cause acalculia (inability to perform mental arithmetic). Lesions of the temporal lobe cause visual field defects (typically homonymous superior quadrantanopia), Wernicke's (receptive) aphasia, auditory agnosia, and memory impairment. Occipital lobe lesions include cortical blindness (blindness due to damage to the visual cortex and may present as Anton syndrome where there is blindness but the patient is unaware or denies blindness), homonymous hemianopia, and visual agnosia (seeing but not perceiving objects - it is different to neglect since in agnosia the objects are seen and followed but cannot be named).

80- The following are recognized features of Pancoast's tumour except:

- 1) ipsilateral Horner's syndrome [0]
- 2) wasting of the dorsal interossei [0]
- 3) pain in the arm radiating to the fourth and fifth fingers [0]
- 4) erosion of the first rib [0]
- 5) weakness of abduction at the shoulder [100]

The tumour causes pain in the C8 and T1 distribution and Horner's syndrome. It may cause small muscle wasting of the hands and erosion of 1st rib. The nerve root for abduction of shoulder is C5.

81- Causes of a small pupil include:

- 1) Carbon Monoxide Poisoning [0]
- 2) Ethylene Glycol Poisoning [0]

- 3) Holme's Adie pupil [0]
- 4) Pontine haemorrhage [100]
- 5) Third Nerve Palsy [0]

Causes of small pupils include Horner's syndrome, old age, pontine haemorrhage, Argyll Robertson pupil, drugs and poisons (opiates, organophosphates). Causes of dilated pupils include Holme's Adie (myotonic) pupil, third nerve palsy, drugs and poisons (atropine, CO, ethylene glycol).

82- A 70-year-old female patient presents with 2 months history of apathy, withdrawal, urinary and faecal incontinence and anosmia. The most likely anatomical site of the neurological lesion is at the:

- 1) frontal lobe [100]
- 2) parietal lobe [0]
- 3) temporal lobe [0]
- 4) occipital lobe [0]
- 5) internal capsule [0]

Frontal lobe syndrome usually presents with personality changes, urinary and faecal incontinence, anosmia, expressive dysphasia (dominant lobe), release of primitive reflexes (positive grasp, pout and palmomentar reflexes) and epilepsy (50%) of patients presenting with status epilepticus (with no previous history of seizures) have frontal lobe tumour. It can mimic dementia.

83- A 21 year old man recovered from the immediate effects of a head injury sustained in a motor cycle accident three months previously.

Which one of the following is the most likely delayed consequence of severe traumatic brain injury?

- 1) Episodic hypersomnia [0]
- 2) Multiple obsessional symptoms [0]
- 3) Outbursts of aggressive behaviour [0]
- 4) Pathological jealousy [0]
- 5) Persistent anxiety [100]

The condition is post-concussion syndrome and although many of the symptoms given may be seen the commonest one (headache) has been left out! "The most common symptoms are headache and neck discomfort; changes in memory, concentration, and attention; dizziness; irritability, depression or anxiety; and sleep disturbance, among other symptoms." There is a disturbance of thought a poor concentration span and subjects are easily distracted. Anxiety would seem the most common and therefore the most likely answer.

84- A patient presented with a quadrantic hemianopia. Which of the following conditions is most likely to cause such a presentation?

- 1) a lesion of the occipital cortex [100]
- 2) a lesion of the optic chiasma [0]

- 3) bilateral diabetic retinopathy [0]
- 4) chloroquine poisoning [0]
- 5) tobacco amblyopia [0]

A lesion of the optic chiasma would cause a bitemporal hemianopia. Diabetic retinopathy may cause an "apparent quadrantic hemianopia" because the distribution of the retinal changes may just correspond to quadrantic hemianopia - but this is not the most likely. Tobacco amblyopia causes symmetric central or centrocaecal scotomas. Chloroquine poisoning causes symmetric bilateral scotomas.

85- A 22 year old female presents with a month history of episodic, brief visual loss affecting the right eye. Over the last one year she had gained a considerable amount of weight. Examination reveals a BMI of 35, with bilateral optic disc swelling, worse on the right and small retinal haemorrhages on the right.

What is the most likely diagnosis?

- 1) benign intracranial hypertension [100]
- 2) Craniopharyngioma [0]
- 3) Graves' Ophthalmopathy [0]
- 4) Optic neuritis [0]
- 5) sagittal sinus thrombosis [0]

This is a classic description of BIH. Drugs such as tetracyclines, the oral contraceptive or pregnancy may be contributory.

86- Frontal lobe brain damage is associated with:

- 1) astereognosis [0]
- 2) auditory agnosia [0]
- 3) dressing apraxia [0]
- 4) focal epileptic fits [0]
- 5) perseveration [100]

Frontal lobe brain damage is classically associated with personality change and deterioration in intellect, but perseveration may also occur. The lesion for astereognosis and acalculia would be in the parietal lobe and dressing apraxia in the dominant parietal lobe. Focal epileptic fits, and auditory agnosia are characteristically associated with temporal lobe damage. Apraxia may result from lesions in the temporoparietal cortex, dominant frontal cortex and corpus callosum.

87- Chronic subdural haematoma in a 75-year-old man is NOT associated with the presence of:

- 1) hemiparesis [0]
- 2) internuclear ophthalmoplegia [100]
- 3) impaired cognitive function [0]
- 4) fluctuating level of consciousness [0]
- 5) bilateral papilloedema [0]

Chronic subdural haematoma is classically associated with fluctuating conscious level and cognitive function. Bilateral papilloedema may occur with raised intracranial pressure. Bilateral internuclear ophthalmoplegia is associated with multiple sclerosis and unilateral lesions of medial longitudinal fasciculus may occur with small brain stem infarcts. Unequal pupils are associated with rapid transtentorial coning in extradural haemorrhage leading to ipsilateral dilated pupil followed by bilateral fixed dilated pupils.

88- A broad-based ataxic gait occurs characteristically with:

- 1) proximal myopathy [0]
- 2) basal ganglia lesion [0]
- 3) right-sided cerebral infarction [0]
- 4) phenytoin toxicity [100]
- 5) cerebellar vermis lesion [0]

Broad based gait is associated with cerebellar syndrome. However, lesions of cerebellar vermis cause truncal ataxia and tendency to fall backwards. Right-sided cerebral infarction is associated with a hemiplegic gait. Basal ganglia disease causes extrapyramidal signs with parkinsonism (festinant gait, marche a petit pas). Proximal myopathy causes a waddling gait.

89- Which ONE of the following is associated with Parkinsonian features?

- 1) Chronic carbon dioxide retention [0]
- 2) Kernicterus [0]
- 3) Lead poisoning [0]
- 4) Mercury poisoning [0]
- 5) Wilson's disease [100]

Poisons that can cause parkinsonism include manganese, carbon monoxide, carbon disulfide, the cycad nut and the illicit drug MPTP (methyl-phenyl tetrahydropyridine). There are also other diseases of the brain that combine parkinsonism. These include Wilson's disease, Huntington's disease, Shy-Drager syndrome, striatonigral degeneration, olivo-ponto-cerebellar degeneration, cortical-basal ganglionic degeneration, progressive supranuclear palsy, diffuse Lewy body disease, Creutzfeldt-Jacob disease and even Alzheimer's disease

90- A 30-year-old female presents to the eye clinic with an acute history of pain and blurring in the right eye. Examination reveals a visual acuity of 6/36 in the right eye but 6/6 in the left eye, a central scotoma in the right eye, with a right swollen optic disc.

What is the most likely diagnosis?

- 1) Compression of the optic nerve [0]
- 2) Cavernous sinus thrombosis [0]
- 3) Glaucoma [0]
- 4) Optic neuritis [100]
- 5) Retinal vein occlusion [0]

The acute presentation with central scotoma, reduced visual acuity and a swollen optic disc in a young female suggests a diagnosis of MS with a retrobulbar neuritis.

91- A 47-year-old man presents with memory impairment worsening over 9 months. He has jerking movements of his limbs and biphasic high-amplitude sharp waves on EEG. Which diagnosis is most likely?

- 1) Alzheimer's disease [0]
- 2) Creutzfeld-Jakob disease [100]
- 3) Multi-infarct dementia [0]
- 4) Normal Pressure Hydrocephalus [0]
- 5) Pick's disease [0]

Biphasic high-amplitude sharp waves are characteristic of Creutzfeld-Jacob disease. However the young age, rapid onset and myoclonus make this diagnosis the most likely.

92- A 72-year-old woman has a five year history of worsening mental functioning with trouble remembering things. She has no problems with movement. She is noted on an MRI scan of the brain to have symmetrically increased size of the lateral ventricles along with cerebral cortical atrophy in a mainly frontal and parietal distribution. A lumbar puncture reveals a normal opening pressure, and analysis of the clear, colorless cerebrospinal fluid reveals a glucose and protein which are in normal ranges. Cell count on the CSF shows 3 WBCs (all lymphocytes) and 1 RBC. A fundoscopic examination is normal. Which of the following findings is most likely associated with her underlying disease process?

- 1) Increased numbers of Lewy bodies [0]
- 2) Loss of Betz cells [0]
- 3) Loss of gamma aminobutyric acid (GABA) [0]
- 4) Perivascular mononuclear inflammation [0]
- 5) Presence of the e4 allele of apolipoprotein E [100]

She has findings characteristic for Alzheimer's disease. Loss of GABA is seen in Parkinson's disease. Perivascular mononuclear inflammation is seen in multiple sclerosis. Loss of Betz cells is seen in Motor Neurone Disease.

93- A 60-year-old man was brought to casualty after a fall in his bathroom. Seen immediately by his family, he was already picking himself up from the floor and said he was not injured. His wife felt that he was transiently dazed. On examination, he was alert, and no abnormalities were noted. His past medical history included a history of hypertension for which he was taking bendrofluazide 2.5 mg daily. He was discharged without any further intervention. Two weeks later his wife brings the patient to see you because the dazed state has returned. Examination reveals a temperature of 36.7C, a pulse rate of 84 bpm regular, a blood pressure of 152/94 mm Hg. On questioning he is slightly slowed, being disoriented to time with some deficit in recent memory. The patient moves slowly, but power is normal. Neurologic

examination shows slight hyperactivity of the tendon reflexes on the right with unclear plantar responses because of bilateral withdrawal.

Which of the following would you request?

- 1) 24-hour ambulatory electrocardiogram [0]
- 2) CSF analysis [0]
- 3) CT of the head [100]
- 4) Electromyography and nerve conduction testing [0]
- 5) EEG [0]

This patient probably has evidence of a right sided hemiparesis and together with the history of confusion and previous head injury a diagnosis of subdural haematoma should be suspected. Consequently the most appropriate investigation would be CT headscan. Particularly in the presence of focal neurology, a CT scan should be performed before embarking upon an LP.

94- Which of the following forms of encephalitis is caused by a neuroimmunological response?

- 1) Herpes simplex [0]
- 2) Measles [100]
- 3) HIV infection [0]
- 4) Enteroviruses [0]
- 5) Cytomegalovirus [0]

Encephalitis may be caused by:

Direct invasion by a neurotoxic virus (encephalitis).

Post-infectious encephalopathy: delayed brain swelling because of an immunological response to the antigen.

Slow virus infection, e.g. HIV or SSPE.

Direct infection is most commonly caused by enteroviruses, HSV 1 and 2, varicella, CMV, and EBV. It is also occasionally caused by respiratory viruses, HHV6, rubella or mumps. A post-infectious illness may also be caused by measles or varicella zoster (cerebellar ataxia).

95- A 60-year-old woman presents with a 24 hours history of headache and vomiting. She has been on steroids for temporal arteritis for the last 3 years. Examination demonstrates pyrexia, neck stiffness, photophobia, dysarthria, nystagmus and ataxia. CSF shows neutrophilic pleocytosis, low glucose, elevated protein. What is the most likely diagnosis?

- 1) Carcinomatous meningitis [0]
- 2) Cryptococcal meningitis [0]
- 3) Listeria meningitis [100]
- 4) Meningococcal meningitis [0]
- 5) Tuberculous meningitis [0]

Risk factors for listeria meningitis include older age and immunosuppression. It is typically associated with brain stem signs. CSF shows neutrophilic pleocytosis, low glucose and high protein.

96- In which of the following is mental retardation an expected finding?

- 1) Alkaptonuria [0]
- 2) Cystinuria [0]
- 3) Glycogen storage disease [0]
- 4) Lactose intolerance [0]
- 5) Maple syrup urine disease [100]

MENTAL RETARDATION. Fragile X syndrome-commonest male cause. Hypoxia at birth, intraventricular haemorrhage, rhesus disease, Congenital infections - toxoplasmosis, CMV, rubella, herpes), hypoglycaemia, meningitis, hypothyroidism (cretinism, tuberous sclerosis, Down's, Tay-Sach's, Cornelia De Lange, Hartnup - biochemical, treatable with diet. -homocystinuria, phenylketonuria -maple syrup urine disease, tryptophanuria -galactosaemia

97- Which of the following is correct regarding Herpes simplex encephalitis?

- 1) shows a peak incidence in the Autumn [0]
- 2) is associated with a polymorphonuclear pleocytosis in the CSF [0]
- 3) produces a diffuse, evenly distributed inflammation of cerebral tissues [0]
- 4) produces a typical EEG pattern with lateralised periodic discharges at 2 Hz [100]
- 5) should be treated with acyclovir as soon as the diagnosis is confirmed by urgent CSF viral antibody titres [0]

This EEG pattern is seen but not diagnostic. Winter is the peak incidence. A lymphocytosis is characteristic in the CSF. Temporal lobe location is typical not diffuse. Immediate treatment required on clinical suspicion - don't wait!

98- A 73-year-old man presents with an abrupt onset of double vision and left leg weakness. Examination shows weakness of abduction of the right eye, right-sided facial weakness affecting upper and lower parts of the face. He also has a left hemiparesis. Where is the lesion?

- 1) left frontal lobe [0]
- 2) left lateral medulla [0]
- 3) right corpus striatum [0]
- 4) right midbrain [0]
- 5) right pons [100]

The abducens nucleus is next to the facial nucleus in pons. they commonly coexist in a pontine CVA. Hemiparesis is also a common feature of pontine lesion.

99- Which of the following statements regarding hiccup is true?

- 1) Is caused by a tonic relaxation of the diaphragm. [0]
- 2) May be caused by local irritation to the vagus nerve. [0]
- 3) Can reliably be treated with theophylline. [0]
- 4) May be caused by a posterior fossa tumour. [100]
- 5) May be caused by a foreign body in the nose. [0]

Hiccup is caused by frequent or rhythmic clonic contraction of the diaphragm. When prolonged, other causes should be considered including:

CNS disease: Posterior fossa tumour, brain injury, encephalitis.

Phrenic nerve or diaphragm irritation: Tumour, pleurisy, pneumonia, intrathoracic adenopathy, pericarditis, gastro-oesophageal reflux, oesophagitis.

Systemic causes: Alcohol intoxication, uraemia.

Other: Foreign body or insect in the ear. In infants it may be associated with apnoea or hyperventilation.

Folk remedies include aerophagia, breath holding, pharyngeal stimulation, distraction. Haloperidol, metaclopramide and several anaesthetic agents are also said to work.

100- In considering the management of convulsions select the correct statement from the list below.

- 1) If the fit lasts longer than 5 minutes, then PR diazepam should be given. [0]
- 2) Phenobarbitone is a useful therapy in school age children. [0]
- 3) Paraldehyde is best given intramuscularly. [0]
- 4) Hypoglycaemia should always be considered. [100]
- 5) When associated with fever, antibiotics should always be given to cover the possibility of meningitis. [0]

Status epilepticus is defined as continuous convulsion lasting greater than 30 minutes, or the occurrence of serial convulsions between which there is no return of consciousness. It may be generalised (tonic clonic, absent) or partial (simple, complex, or with secondary generalisation). Generalised tonic clonic seizures predominate. There are 3 major sub-types:

Prolonged febrile seizures.

Idiopathic status epilepticus (no underlying CNS lesion or insult).

Symptomatic (long-standing neurological disorder or metabolic abnormality).

The commonest cause in a child less than 3 years is a prolonged febrile seizure. Sleep deprivation and drug withdrawal can also precipitate it. The relationship between neurological outcome and duration of status epilepticus is unknown in children and adults. In the animal model, 60 minutes of constant seizure activity is associated with pathological changes, even when metabolic homeostasis is maintained. Cell death thus results in increased metabolic demands from continually discharging neurones. Vulnerable areas include the hippocampus, the mid to low cerebellum, middle cortical areas, and thalamus. Approximately, 20 minutes of status epilepticus produces regional oxygen sufficiency promoting cell damage and necrosis. This is, therefore, used as the threshold in children. Initial management begins with ABC.

Hypoglycaemia should be excluded (if present 5ml/kg of 10% dextrose is given by IV infusion), and blood obtained for full blood count, electrolytes including calcium and magnesium, glucose, creatinine, anticonvulsant levels. Blood and urine may be obtained for toxicology. Arterial blood gases should be done, and consideration given to lumbar puncture.

First line anticonvulsant therapy would be diazepam given IV if possible. If seizures persist then phenytoin may be given as a loading dose followed by an infusion. Phenobarbitone may be used as first line in infants. Paraldehyde can be given as a dilute solution intravenously, or administered rectally or IM. The latter 2 routes can produce tissue damage and sloughing, so these should be reserved for exceptional circumstances.

101- The action of noradrenaline released at sympathetic nerve endings is terminated by

- 1) enzymatic decarboxylation [0]
- 2) enzymatic inactivation by catechol-O-methyl transferase [0]
- 3) re-uptake of noradrenaline by the axonal terminals [100]
- 4) oxidative deamination by monoamine oxidase [0]
- 5) Removal by the circulating blood [0]

A popular question for the exam but simple physiology gets the right answer here. The effects of neurotransmitter release are principally terminated by neuronal uptake. Intraneuronal NA is usually taken back up into the neurosecretory granules and a small amount is metabolised by MAO. Even smaller quantities that escape into the circulation are metabolised by COMT.

102- A 65 year-old woman with 12 hour history of unsteady gait, sudden onset associated with vomiting and headache. Following this she had increasing drowsiness. What is the diagnosis?

- 1) Acute subdural haemorrhage [0]
- 2) Cerebellar haemorrhage. [100]
- 3) Frontal subdural empyema [0]
- 4) Herpes simplex encephalitis. [0]
- 5) Pituitary apoplexy. [0]

The history is very typical of cerebellar haemorrhage. The drowsiness suggests the presence of hydrocephalus, a common complication of cerebellar haemorrhage.

103- A 18-year-old female presents with a 3 days history of progressive weakness and numbness of her legs, urinary retention and back pain 2 weeks following an upper respiratory infection. On examination there is spastic paraparesis, sensory level up to T5, extensor plantars. Examination of cranial nerves and upper limbs is normal. MRI of the spine is normal. The most likely diagnosis is:

- 1) Multiple sclerosis [0]
- 2) Anterior spinal artery occlusion [0]
- 3) Post-infectious transverse myelitis [100]
- 4) Thoracic disc prolapse [0]
- 5) Guillain Barre syndrome [0]

Transverse myelitis usually follows an upper respiratory tract infection. It causes a complete spinal cord syndrome. MRI spine may show an intrinsic inflammatory lesion or be normal. Multiple sclerosis usually causes a partial spinal cord syndrome

(asymmetrical paraparesis). Anterior spinal artery occlusion causes an acute onset of spinal cord syndrome with spinal shock (flaccid paraplegia). Guillain Barre syndrome causes lower motor neuron signs.

104- A 40-year-old man with a long history of alcohol abuse is admitted with a subacute illness, comprising headache, fever, meningism and ataxia. MRI brain showed patchy high signal abnormality of the brain stem. CSF analysis showed polymorphonuclear pleocytosis and low glucose. He had failed to improve after 3 days of intravenous cefotaxime treatment. The most likely diagnosis of the meningitis is:

- 1) Mycobacterium tuberculosis [0]
- 2) Cryptococcus neoformans [0]
- 3) Nocardia asteroides [0]
- 4) Staphylococcus aureus [0]
- 5) Listeria monocytogenes [100]

Listeria meningitis should always be considered in patients with meningitis associated with brain stem involvement. The treatment of choice is gentamycin and ampicillin. TB and fungal meningitis usually showed a lymphocytic pleocytosis.

105- A 27-year-old man presents with a two years history of intermittent tingling sensation involving his left side. It starts in his fingers and spreads in 10-20 seconds to affect the whole arm and leg on the same side. The attacks only last for one minute. The most likely diagnosis is:

- 1) Migraine with aura [0]
- 2) Transient ischaemic attacks [0]
- 3) Somatosensory seizures [100]
- 4) Hyperventilation [0]
- 5) Multiple sclerosis [0]

Positive symptoms (jerking, tingling) usually signify epilepsy. Negative symptoms (weakness, numbness) are usually caused by transient focal ischaemia. Spread of symptoms ('marching') indicates migraine (in 5-20 minutes) or seizures (in seconds). The usual source of somatosensory seizures is the parietal lobe.

106- A 24-year-old man presents with a headache that has been present for nine months. He has headache almost every day, mainly frontal, sometimes with nausea. Current medication includes paracetamol, brufen and codeine with only transient relief of symptoms. He has a history of depression. Examination was normal.

What is the most likely diagnosis?

- 1) analgesic misuse headache [100]
- 2) cluster headache [0]
- 3) frontal brain tumour [0]
- 4) headache due to depression [0]
- 5) migraine [0]

This is one of the commonest cause of chronic daily headache (the commonest is chronic tension type headache). It is commonly caused by the chronic use of

analgesics such as codeine phosphate and paracetamol). Treatment consists of reducing the amount of analgesics gradually until stopped.

107- A 60-year-old man awakens with painless loss of vision of his left eye. Three years earlier he had suffered a similar episode involving the right eye. Visual loss in that eye has been stationary. He does not complain of any systemic symptoms. What is the most likely diagnosis?

- 1) Optic neuritis [0]
- 2) Nonarteritic ischaemic optic neuropathy [100]
- 3) Arteritic ischaemic optic neuropathy [0]
- 4) Acute angle-closure glaucoma [0]
- 5) Compressive optic neuropathy [0]

Sudden onset of painless monocular visual loss in patients aged 50 or more is commonly due to ischaemic optic neuropathy. Commonly the symptoms are first noticed upon awakening in the morning. The fellow eye may suffer a similar event within 5 years. There are no systemic features (weight loss, lethargy, malaise, jaw claudication, scalp tenderness) to suggest arteritic ischaemic optic neuropathy (Giant cell arteritis). In Giant cell arteritis, the fellow eye is usually affected within 4 weeks. Optic neuritis is unlikely in a man of this age, who had painless loss of vision.

108- A 67-year-old man has drunk 8 units of alcohol a day for most of his adult life. He has worsening symptoms of poor memory, a wide-based gait and urinary incontinence for ten months. What is the most likely diagnosis?

- 1) HIV encephalitis [0]
- 2) meningovascular syphilis [0]
- 3) normal pressure hydrocephalus [100]
- 4) syringomyelia [0]
- 5) Wernicke-Korsakoff syndrome [0]

The triad of memory loss, gait difficulties and urinary incontinence will lead towards the diagnosis of normal pressure hydrocephalus.

109- A 40 year old male is diagnosed with Dystrophia myotonica. Which one of the following features would be expected in this patient?

- 1) Autosomal recessive inheritance [0]
- 2) Cataracts [100]
- 3) Fasciculations would predominate [0]
- 4) Progressive external ophthalmoplegia [0]
- 5) Preserved tendon reflexes despite muscle wasting [0]

Dystrophia myotonica is an autosomal dominant condition with variable penetrance. Symptoms characteristically begin from the age of 20-30 with weakness and myotonia. Cataracts, Ptosis, Frontal baldness, gynaecomastia, diabetes, reduced reflexes with myotonia are features. Progressive external ophthalmoplegia is a feature of Ocular muscular dystrophy. c-20-30 years, e-Lost.

110- A 40-year-old man presents with 2 years history of intermittent strictly unilateral headaches. The pain is excruciating severe. It is located around the orbital region. The headache usually lasts 45-60 minutes. It usually appears early hours in the morning. There is associated ptosis and lacrimation on the side of the headache. The most likely diagnosis is:

- 1) Cluster headaches [100]
- 2) Migraine [0]
- 3) Tension type headache [0]
- 4) Giant cell arteritis [0]
- 5) Trigeminal neuralgia [0]

Cluster headache has three important features: trigeminal distribution pain, ipsilateral cranial autonomic features, and the striking tendency to circadian and circannual periodicity. It is commoner in men (5:1). It is associated with lacrimation, rhinorrhea, conjunctival injection, ptosis and miosis. The common age of onset is the third or fourth decade of life.

111- A 50 year old female presents with a 4 month history of progressive distal sensory loss and weakness. On examination positive neurological findings include moderate proximal and distal weakness of arms and legs, glove and stocking sensory loss and areflexia. Planter responses were mute. The following conditions could give a similar picture:-

- 1) Guillian-Barre syndrome [0]
- 2) Chronic inflammatory demyelinating neuropathy(CIDP) [100]
- 3) Cervical spondylosis [0]
- 4) Hereditary motor and sensory neuropathy(HMSN) [0]
- 5) Myasthenia Gravis [0]

The history is compatible with a subacute sensory and motor peripheral neuropathy. Causes of such conditions include inflammatory neuropathies such as CIDP and paraproteinaemic neuropathies. Guillian-Barre syndrome is an acute post-infectious neuropathy which reaches its peak in severity within six weeks. Cervical spondylosis would cause upper motor neurone signs such as hyperreflexia, extensor plantar response and possibly a sensory level. HMSN is usually a very chronic neuropathy developing over many years and usually with a family history of the condition. Myasthenia gravis causes weakness and fatigability but never sensory symptoms.

112- Which one of the following would support a diagnosis of subacute combined degeneration of the cord rather than multiple sclerosis?

- 1) absent ankle jerks [100]
- 2) autonomic symptoms [0]
- 3) cerebellar signs [0]
- 4) extensor plantars [0]
- 5) visual problems [0]

The causes of absent ankle reflexes and extensor plantars include subacute combined degeneration of the cord (posterior column signs, positive Romberg's sign' anaemia,

splenicomegaly), syphilitic taboparesis, Friedreich's ataxia, and motor neurone disease. Knee reflexes in SACDC may be increased, normal or absent. In the latter stages of MS with marked muscle wasting, knee jerks may also be absent. All the other features may be common to both conditions - Optic atrophy, cerebellar ataxia and spasticity.

113- A 65-year-old woman has a one month history of malaise, weight loss, right sided pain around the eye and headaches. She has also noticed intermittent diplopia.

Five years previously she had a mastectomy for carcinoma of the breast. On examination, temperature was 37.5°C, there was tenderness of the scalp on the right forehead and temple, and some minor weakness of abduction of the right eye. ESR 55 mm/hour.

What is the most likely diagnosis?

- 1) thyroid eye disease [0]
- 2) frontal sinusitis [0]
- 3) giant cell arteritis [100]
- 4) meningeal metastatic disease [0]
- 5) posterior communicating artery aneurysm [0]

The clinical description is classic for giant cell arteritis. It should always be considered in the elderly patients with headaches, ocular symptoms, systemic symptoms and high ESR.

114- A sixty year old male presents with a six month history of a gradually increasing burning sensation in his feet. Examination revealed normal cranial nerves and higher mental function. Normal bulk, tone, power, light touch and pinprick sensation, co-ordination and reflexes in upper and lower limbs. The clinical findings are consistent with:-

- 1) Large fibre sensory neuropathy [0]
- 2) Small fibre sensory neuropathy [100]
- 3) Diabetic Amyotrophy [0]
- 4) Motor neurone disease [0]
- 5) Sjogrens syndrome [0]

The burning sensation described is typical of a neuropathy affecting the small unmyelinated and thinly myelinated nerve fibres. General neurological examination and reflexes are usually normal in this type of neuropathy unless there is coexisting large(myelinated) fibre involvement. Neuropathy affecting the large myelinated sensory fibres generally cause glove and socking sensory loss and loss of reflexes. Conditions in which the small fibres are preferentially affected in the early stages include diabetes and amyloidosis. In the later stages however the neuropathy in these conditions also affects large fibres. The neuropathy associated with Sjogrens syndrome is a pure sensory neuropathy (ganglionopathy).

115-Which of the following anatomical considerations is correct:

- 1) optic chiasm lesions characteristically produce a bitemporal hemianopia [100]
- 2) central scotoma occurs early in papilloedema [0]

- 3) in cortical blindness pupillary reactions are abnormal [0]
- 4) optic tract lesions produce an ipsilateral homonymous hemianopia [0]
- 5) optokinetic nystagmus is found with bilateral infarction of the parieto-occipital lobes [0]

b-Enlarged blind spot, d-contralateral, e-cerebellar lesions.

116- A 62 year old male is noted to have a broad-based ataxic gait. This is characteristic of which of the following?

- 1) A basal ganglia lesion [0]
- 2) Cerebellar vermis lesion [0]
- 3) Osteomalacia [0]
- 4) phenytoin toxicity [100]
- 5) Right-sided cerebral infarction [0]

Broad based gait is associated with cerebellar syndrome. However, lesions of cerebellar vermis cause truncal ataxia and tendency to fall backwards. Right-sided cerebral infarction is associated with a hemiplegic gait. Basal ganglia disease causes extrapyramidal signs with Parkinsonism (festinant gait, marche à petit pas). Proximal myopathy causes a waddling gait.

117- A lesion of the facial nerve in the internal auditory meatus will NOT affect

- 1) taste [0]
- 2) sweating over the cheek [100]
- 3) lacrimation [0]
- 4) hearing [0]
- 5) blinking [0]

The extent of dysfunction depends on the level of injury. If it is proximal to geniculate ganglion eg internal auditory meatus, taste is lost in the anterior 2/3 of tongue. Also secretion from submandibular, sublingual and lacrimal glands is impaired. Hyperacusis is due to paralysis of stapedius. Orbicularis oculi is affected causing inability to blink/close eyelids. Sensation over face supplied by trigeminal nerve, and sweat glands controlled by sympathetic nervous system eg anhydriosis in Horner's syndrome.

118- Which of the following is a form of generalised seizure?

- 1) Aversive seizures [0]
- 2) Epilepsia partialis continua [0]
- 3) Automatisms [0]
- 4) Lennox Gastaut Syndrome [100]
- 5) Benign rolandic epilepsy [0]

Seizures may be classified as:

- a) Partial

Simple partial (consciousness retained), motor, sensory, autonomic, psychic.
Complex Partial (consciousness impaired):
Simple partial followed by impaired consciousness, or consciousness impaired at onset.
Partial seizures with secondary generalisation

b) Generalised Seizures

Absences (typical or atypical).
Generalised tonic clonic.
Tonic.
Clonic.
Myoclonic.
Atonic.
Infantile spasms.

c) Unclassified Aversive seizures are a form of simple partial seizure, consisting of head turning and conjugate eye movements. Rasmussen's encephalitis is a sub-acute inflammatory encephalitis, and is one cause of epilepsia partialis continua. Complex partial seizures often contain automatisms which may be elementary (including lip smacking, chewing, swallowing or salivation), or automatic behaviour (semi-purposive uncoordinated or unplanned gestures including picking and pulling at clothing). Rolandic epilepsy is a benign partial epilepsy associated with centro-temporal spikes. There is an excellent prognosis.

119- A 21-year-old female presented with a sudden onset of left sided head and neck pain. 24 hours later she presents with sudden onset of right hemiparesis, facial weakness and homonymous hemianopia and left horner's syndrome. A CT brain showed a left middle cerebral artery territory infarction. The most likely diagnosis is:

- 1) Cardiac embolism [0]
- 2) Migraine [0]
- 3) Left Carotid artery dissection [100]
- 4) Antiphospholipid syndrome [0]
- 5) Systemic vasculitis [0]

The two commonest causes of young onset stroke (<40 years) are cardioembolism and carotid artery dissection. Carotid artery dissection is either spontaneous or traumatic. Facial/head/neck pain and Horner's syndrome are characteristic features. Migrainous stroke usually affects the posterior circulation (posterior cerebral artery territory is the commonest).

120- A 25 year-old man presents with 24 hours blurred vision in left eye and mild frontal headache. He has a 10 year history of Diabetes Mellitus. Examination reveals a central scotoma. What is the diagnosis?

- 1) Central retinal artery occlusion. [0]
- 2) Diabetic retinopathy. [0]
- 3) Optic neuritis. [100]
- 4) Pituitary tumour. [0]

5) Migraine. [0]

Optic neuritis typically presents with unilateral painful visual impairment in young people. Central scotoma is the typical visual defect of optic neuritis. Diabetic neuropathy, migraine and central retinal artery occlusion do not cause central scotoma.

121- A 72-year-old lady has 4 months of memory loss, urinary incontinence and falls. On examination she has mild memory loss and a broad-based, slow gait. Muscle tone is normal and both plantar reflexes are downgoing. What is the likely diagnosis?

- 1) Alzheimer's disease [0]
- 2) Frontal lobe dementia [0]
- 3) Multi-infarct dementia [0]
- 4) Normal-pressure hydrocephalus [100]
- 5) Parkinson's disease [0]

Normal pressure hydrocephalus characterized by abnormal gait, urinary incontinence, and dementia. It is an important clinical diagnosis, because it is a potentially reversible cause of dementia. It is important to distinguish it from Parkinson's Disease. The onset of gait disturbance and urinary symptoms is unusual so early in dementia. Frontal lobe dementia is characterised by loss of 'executive' functions and multi-infarct state usually has a step-wise history.

122- Baclofen

- 1) acts directly on skeletal muscle [0]
- 2) causes rhabdomyolysis [0]
- 3) reduces cerebral but not spinal spasticity [0]
- 4) cause hallucinations when withdrawn [100]
- 5) reduce Ca²⁺ release from sarcoplasmic reticulum [0]

Primary site of action is the spinal cord, by depressing monosynaptic and polysynaptic transmission. It can hyperpolarise cells by increasing K⁺ conductance and inhibit Ca²⁺ channels in others. Rhabdomyolysis caused by clofibrate, aminocaproic acid, HMGCoA reductase inhibitors and neuroleptics (neuroleptic malignant syndrome). Avoid abrupt withdrawal as it can cause serious side-effects including autonomic dysreflexia.

123- A 26-year-old previously healthy woman has the sudden onset of mental confusion. She has a seizure and is brought to the hospital. Her vital signs show blood pressure 100/60 mm Hg, temperature 37 C., pulse 89, and respirations 22. A lumbar puncture reveals a normal opening pressure, and clear, colorless cerebrospinal fluid is obtained with 1 RBC and 20 WBC's (all lymphocytes), with normal glucose and protein. An MRI scan reveals swelling of the right temporal lobe with hemorrhagic areas. Which of the following infectious agents is the most likely cause for these findings?

- 1) Haemophilus influenzae [0]
- 2) Herpes simplex virus [100]

- 3) Influenza virus [0]
- 4) Mycobacterium tuberculosis [0]
- 5) Neisseria meningitidis [0]

Haemorrhagic lesions of the temporal lobe are typical for Herpes simplex virus infection. Hemophilus influenzae is the organism most associated with meningitis in children. Neisseria meningitidis would cause meningitis - however, in this case there are lymphocytes not neutrophils in the CSF and a normal not low glucose.

124- Which of the following statements regarding central pontine myelinolysis is correct?

- 1) Consciousness is preserved characteristically. [0]
- 2) MR imaging shows diagnostic features in the majority of patients. [0]
- 3) The cause has been linked to over-rapid correction of hyponatraemic states. [100]
- 4) The condition is confined to malnourished alcoholic patients. [0]
- 5) The pathological changes are confined to the pons. [0]

Central pontine myelinolysis is a common consequence of over-rapid correction of hyponatraemia. Pathological changes are not confined to the pons (despite the name of the condition). MRI usually shows changes within the pons, however the appearances are not diagnostic. Consciousness is usually impaired. It can occur in malnourished alcoholic patients (but it is not confined to them).

125- A 48 year old man presented with a two week history of recurrent severe right-sided peri-orbital headache, frequently nocturnal and occurring at least once daily, usually lasting an hour. He had noticed lacrimation from the right eye and blockage of the right nostril during the headache. At the time of the examination he was free from headache and there were no abnormal physical signs.

Which of the following is the most likely diagnosis?

- 1) cluster headache [100]
- 2) intracranial aneurysm [0]
- 3) orbital pseudotumour [0]
- 4) right maxillary sinusitis [0]
- 5) trigeminal neuralgia [0]

Cluster headaches are commoner in men (M:F 10:1). They are usually presents nocturnally (early morning). They are paroxysmal (occur in clusters). They are associated with autonomic symptoms: lacrimation, ptosis, pupil constriction, nasal congestion, redness of eye, swelling of eyelid. Examination between the attacks should be normal.

126- Which of the following is a true of myasthenia gravis?

- 1) there is a strong association with anti-noradrenergic receptor antibodies [0]
- 2) neurotransmitter released at the motor end plate is greatly reduced [0]

- 3) repetitive stimulation of a motor nerve produces a reduction in the amplitude of the 5th response compared with the 1st in 98% of cases (electrodecremental test) [0]
- 4) electrical recordings of single motor unit activity commonly reveal variation in the latency of the various muscle fibre responses (jitter) [100]
- 5) subjective improvement in muscle strength following edrophonium is diagnostic of the condition [0]

Anti-acetylcholine receptor antibodies are typically found resulting in reduced ACh receptor numbers but sufficient neurotransmitter is released. An increase in decrement on stimulation at 3Hz is detectable in some patients. Jitter is the most sensitive emg index in MG but is not specific of the condition. The nerve conductions and EMG studies are usually normal in myasthenia gravis, but the repetitive stimulation of a nerve may demonstrate decrements of the muscle action potential (far less than 98%). Although improved muscle strength after edrophonium is seen, it is not diagnostic but depends more on the clinical presentation and presence of AChR ab.

127- A 55-year-old man has progressive weakness of his hands over a period of 1 year. Examination reveals wasting of the muscles of the hands and forearms and fasciculation. There is hyper-reflexia of his lower limbs and upgoing plantars. Sensation is normal. Which of the following is the most likely diagnosis?

- 1) Alzheimer's disease [0]
- 2) Motor Neurone Disease [100]
- 3) Multiple Cerebral Infarcts [0]
- 4) Multiple Sclerosis [0]
- 5) Syringomyelia [0]

There is a mixture of lower motor neurone signs in the upper arms and upper motor neurone signs in the legs. Cerebrovascular disease and Alzheimer's disease are therefore unlikely. The history is of gradual onset over 1 year which makes Multiple sclerosis less likely since it is usually abrupt in the onset of symptoms. Syringomyelia is unlikely since sensation is unaffected. This leaves Motor Neurone Disease particularly of the Amyotrophic Lateral Sclerosis type.

128- A 25-year-old female presented with 6 months history of depression, irritability and painful sensory symptoms in her legs. Over the last 4 weeks she presents a broad base ataxic gait. An MRI brain showed bilateral posterior thalamic nuclei (pulvinar region) high signals. The most likely diagnosis is:

- 1) Sporadic CJD [0]
- 2) New variant CJD [100]
- 3) Wilson disease [0]
- 4) Multiple system atrophy [0]
- 5) Herpes simplex encephalitis [0]

New variant CJD usually presents in a young person, in their twenties or thirties. In the majority of the cases, the first symptoms are psychiatric and painful sensory symptoms in the lower limbs. Ataxia and involuntary movements (e.g. myoclonus) usually appear at interval of about 6 months after the initial symptoms. MRI brain

shows bilateral pulvinar (posterior thalamic nuclei) high signals. EEG is usually normal in new variant CJD.

129- A 70-year-old woman presented with episodic impairment of consciousness. Which of the following is the most likely cause?

- 1) Alzheimer type dementia [0]
- 2) chronic sub-dural haematoma [100]
- 3) Creutzfeldt-Jacob disease [0]
- 4) depressive stupor [0]
- 5) normal pressure hydrocephalus [0]

This is quite a grey question. The clinical scenario is very brief with no mention of any neurological signs so a logical deduction must be made.

Alzheimer's disease would be expected to have a continuous impairment of consciousness in its advanced stages but could be episodic if there were variation in drugs therapy or concurrent illnesses. Similarly Normal Pressure Hydrocephalus, Creutzfeld-Jacob and depression would present with dementia (or apparent dementia) but not fluctuant.

Of all those listed subdural haematoma is classically associated with fluctuating level of consciousness. This would make it the most likely.

130 -A lesion of the Frontal lobe causes:

- 1) Apraxia [0]
- 2) Broca's (expressive) aphasia [100]
- 3) Cortical blindness [0]
- 4) Homonymous hemianopia [0]
- 5) Visuospatial neglect [0]

Lesions of the frontal lobe include difficulties with task sequencing and executive skills. Expressive aphasia (receptive aphasia is a temporal lobe lesion), primitive reflexes, perseveration (repeatedly asking the same question or performing the same task), anosmia and changes in personality. Lesions of the parietal lobe include apraxias, neglect, astereognosis (unable to recognise an object by feeling it) and visual field defects (typically homonymous inferior quadrantanopia). They may also cause acalculia (inability to perform mental arithmetic). Lesions of the temporal lobe cause visual field defects (typically homonymous superior quadrantanopia), Wernicke's (receptive) aphasia, auditory agnosia, and memory impairment. Occipital lobe lesions include cortical blindness (blindness due to damage to the visual cortex and may present as Anton syndrome where there is blindness but the patient is unaware or denies blindness), homonymous hemianopia, and visual agnosia (seeing but not perceiving objects - it is different to neglect since in agnosia the objects are seen and followed but cannot be named).

131- A 65-year-old man has a monotonous, slurred speech. He has an expressionless face and a festinant gait. There is also impairment of vertical gaze. What is the most likely underlying aetiology?

- 1) Shy-Drager syndrome [0]
- 2) idiopathic [0]
- 3) cerebrovascular disease [0]
- 4) Wilson's disease [0]
- 5) Steele-Richardson-Olszewski syndrome [100]

Parkinson's disease is a triad of bradykinesia, tremor and rigidity. Speech may be slurred and without accents or emphasis. Impairment of vertical gaze suggests the diagnosis of Steele-Richardson-Olszewski syndrome or supranuclear gaze palsy, which also cause pyramidal signs, dementia or frontal lobe syndrome. Response to L-dopa is poor and median survival is about 7 years. Shy-Drager syndrome is associated with autonomic dysfunction and postural hypotension. Wilson's disease presents in children and young adults with cirrhosis and parkinsonism, which later leads to dementia, dysphagia and immobility.

132- Which of the following may cause a downbeat nystagmus?

- 1) Chiari type I malformation [100]
- 2) Unilateral medial longitudinal fasciculus lesion [0]
- 3) Central cerebellar lesion [0]
- 4) Wernicke's encephalopathy [0]
- 5) Aqueduct stenosis [0]

Nystagmus is defined as involuntary oscillations of the eyes. This may be pendular when the oscillations are equal in rate and amplitude; jerking - when there are quick and slow phases (the quicker phase is used to define the direction. Nystagmus may be caused by visual disturbances, lesions of the labyrinth or the central vestibular connections, or by brain stem or cerebellar lesions. Pendular nystagmus is usually due to loss of macular vision, but may be seen in diffuse brain stem lesions. Jerking nystagmus, which is of constant direction regardless of the direction of gaze, suggests a labyrinthine or cerebellar lesion. Nystagmus which changes with the direction of gaze suggests a widespread central involvement of vestibular nuclei. Jerking nystagmus present only on lateral gaze, and whose fast component is in the direction of gaze, indicates a lesion of the brain stem or cerebellum. Nystagmus confined to one eye suggests a peripheral lesion of the nerve or muscle, or a lesion of the medial longitudinal bundle. Nystagmus restricted to the abducting eye on lateral gaze (ataxic nystagmus) is due to a lesion of the medial longitudinal bundle between the pons and mid-brain as in MS. Nystagmus occurring on upward gaze with the fast component upwards (upbeat nystagmus) may be due to a lesion in the mid-brain at the level of the superior colliculus. Downbeat nystagmus (fast phase downwards) suggests a lesion in the lower part of the medulla. It is therefore, typical of the Arnold Chiari malformation.

133- A 35 year old female presents with headaches. Examination reveals papilloedema. Which of the following would make the diagnosis of benign intracranial hypertension unlikely?

- 1) Absence of retinal venous pulsations [0]
- 2) Bilateral upgoing plantar responses [100]
- 3) Normal ventricles on CT or MRI scan [0]

- 4) Reduced visual acuity [0]
- 5) VIth cranial nerve palsy [0]

BIH is typically associated with papilloedema reduced venous pulsation and normal appearances of the MRI. A VI nerve palsy is a recognised association. Reflexes are preserved and plantars are flexor. Extensor plantars suggest a alternative diagnosis.

134-A teenage girl presents with Guillain-Barre syndrome. Her weakness continues to worsen after admission to hospital. Which of the following should be used to monitor her?

- 1) arterial blood gases [0]
- 2) chest expansion size [0]
- 3) FEV1/FVC ratio [0]
- 4) PEFr [0]
- 5) vital capacity [100]

This is the best way to monitor respiratory function in any neurological disorders that can affect the respiratory muscles (e.g. GBS, Myasthenia gravis).

135- A 60 year old man has Parkinson's disease. He is started on treatment with L-dopa and dopa decarboxylase inhibitor therapy. However he continues to have troublesome tremor. Which of the following drugs would be most likely to help?

- 1) Amantadine. [0]
- 2) Benzexol. [100]
- 3) Propranolol [0]
- 4) Ropinirole [0]
- 5) Selegiline [0]

Anticholinergic drugs such as Benzexol remains the treatment of choice in Parkinsonian tremor. L-dopa, selegiline and dopamine agonists are less effective in tremor. Propranolol is the treatment of choice in essential tremor.

136- Which of the following would be expected features of a LEFT Posterior cerebral artery occlusion :

- 1) a right homonymous hemianopia [100]
- 2) internuclear ophthalmoplegia [0]
- 3) Wernicke's aphasia [0]
- 4) pure aphasia (i.e. without alexia) [0]
- 5) decerebrate state [0]

b- typical of multiple sclerosis. c+d-Middle cerebral artery. e-False? Pontine lesion. Other possible findings in posterior left cerebral artery occlusion: cortical blindness, visual hallucinations, thalamic syndrome, Claude's and Weber's syndromes.

Stroke

1- A 70-year-old woman has a history of dyspnoea and palpitations for six months. An ECG at that time showed atrial fibrillation. She was given digoxin, diuretics and aspirin. She now presents with two short-lived episodes of altered sensation in the left face, left arm and leg. There is poor coordination of the left hand. ECHO was normal as was a CT head scan.

What is the most appropriate next step in management?

- 1) anticoagulation [100]
- 2) carotid endarterectomy [0]
- 3) clopidogrel [0]
- 4) corticosteroid treatment [0]
- 5) no action [0]

This patient is having symptoms of transient ischaemic attacks most likely due to a cardiac source of emboli. A normal ECHO or CT head does not rule out thrombo-embolic events. There is an increased risk of strokes in patients with atrial fibrillation and hence with the given symptoms formal anticoagulation with warfarin should be considered.

2- A patient presented with a quadrantic hemianopia. Which of the following conditions is most likely to cause such a presentation?

- 1) a lesion of the occipital cortex [100]
- 2) a lesion of the optic chiasma [0]
- 3) bilateral diabetic retinopathy [0]
- 4) chloroquine poisoning [0]
- 5) tobacco amblyopia [0]

A lesion of the optic chiasma would cause a bitemporal hemianopia. Diabetic retinopathy may cause an "apparent quadrantic hemianopia" because the distribution of the retinal changes may just correspond to quadrantic hemianopia - but this is not the most likely. Tobacco amblyopia causes symmetric central or centrocaecal scotomas. Chloroquine poisoning causes symmetric bilateral scotomas.

3- A 57-year-old man develops deep venous thrombosis during a hospitalization for prostatectomy. He exhibits decreased mental status with right hemiplegia, and a CT scan of the head suggests an acute cerebral infarction in the distribution of the left middle cerebral artery. A chest X-ray reveals cardiac enlargement and prominence of the main pulmonary arteries that suggests pulmonary hypertension. His serum troponin I is <0.4 ng/mL. Which of the following lesions is most likely to be present on echocardiography?

- 1) Coarctation of the aorta [0]
- 2) Dextrocardia [0]
- 3) Pulmonary stenosis [0]
- 4) Tetralogy of Fallot [0]
- 5) Ventricular septal defect [100]

This is 'paradoxical embolus' from right to left. This can only happen if there is a defect that allows passage from right-to-left. This can happen across a patent foramen

ovale. In this case, the pulmonary hypertension suggests that there may have been a shunt persistent for a long time - Eisenmenger complex. An atrial or a ventricular septal defect can provide the shunt.

4- A 55-year-old woman has had worsening shortness of breath for several years. She now has to sleep sitting up on two pillows. She has difficulty swallowing. There is no history of chest pain. She is afebrile. Recently, she suffered a stroke with left hemiparesis. A chest X-ray reveals a near-normal left ventricular size with a prominent left atrial border. Which of the following conditions is most likely to account for these findings?

- 1) Aortic coarctation [0]
- 2) Cardiomyopathy [0]
- 3) Essential hypertension [0]
- 4) Left renal artery stenosis [0]
- 5) Mitral valve stenosis [100]

Mitral valve stenosis leads to left atrial enlargement, but the left ventricle is usually small. An enlarged left atrium may lead to pressure posteriorly on the oesophagus. Most mitral valvular disease in adults results from rheumatic heart disease.

5- A 63 year old male is admitted with acute onset unsteadiness of gait, dizziness and dysphagia. Examination revealed a right-sided Horner's syndrome, nystagmus, loss of pain and temperature sensation on the left side of the trunk and in the left arm and leg, and gait ataxia.

What is the most likely diagnosis?

- 1) leaking posterior communicating artery aneurysm [0]
- 2) left sided acoustic neuroma [0]
- 3) posterior inferior cerebellar artery occlusion [100]
- 4) right sided pontine infarct [0]
- 5) spontaneous left sided cerebellar haemorrhage [0]

This is Wallenberg's syndrome/ lateral medullary syndrome and is due to occlusion of the posterior inferior cerebellar artery.

6- Which of the following would be expected following distal occlusion of the posterior cerebral artery?

- 1) cerebellar ataxia [0]
- 2) contralateral hemiplegia [0]
- 3) dysarthria [0]
- 4) homonymous hemianopia [100]
- 5) palatal palsy [0]

Distal (peripheral territory) posterior cerebral artery stroke, homonymous hemianopia (often upper quadrantic), cortical blindness, verbal dyslexia without agraphia, hemivisual neglect, visual hallucinations(Harrisons).

7- Which of the following would be expected features of a LEFT Posterior cerebral artery occlusion :

- 1) a right homonymous hemianopia [100]
- 2) internuclear ophthalmoplegia [0]
- 3) Wernicke's aphasia [0]
- 4) pure aphasia (i.e. without alexia) [0]
- 5) decerebrate state [0]

b- typical of multiple sclerosis. c+d-Middle cerebral artery. e-False? Pontine lesion.
Other possible findings in posterior left cerebral artery occlusion: cortical blindness, visual hallucinations, thalamic syndrome, Claude's and Weber's syndromes.

Neuroscience

1- Regarding pseudotumours cerebri (benign hypercranial hypertension) which is true?

- 1) A mildly increased CSF cell count is typical. [0]
- 2) May be caused by prolonged steroid therapy. [100]
- 3) Is occasionally associated with focal neurological signs. [0]
- 4) Frequently presents with ataxia. [0]
- 5) Is distinguished from hydrocephalus by the absence of suture separation. [0]

Pseudotumour cerebri is a clinical syndrome that mimics brain tumours, and is characterised by raised intracranial pressure with normal CSF cell count and protein content, normal ventricular size, anatomy and position. Causes:

Metabolic disorders: galactosaemia, hypoparathyroidism, pseudohyperparathyroidism, hypophosphatasia, steroid therapy, hypervitaminosis A, vitamin A deficiency, Addison's Disease, obesity, menarche, oral contraceptives, pregnancy.

Infections: Roseola infantum, chronic otitis media, mastoiditis, Guillain Barré Syndrome. · Drugs: Nalidixic acid, tetracycline.

Haematological disorders: Polycythemia, haemolytic and iron deficiency anaemia, Wiskott Aldrich Syndrome.

Destruction of intracranial drainage by venous thrombosis: Lateral sinus or posterior sagittal sinus thrombosis, head injury, obstruction of the superior vena cava. It usually presents with headache and vomiting, though this is rarely as bad as that associated with posterior fossa tumour.

Diplopia is common due to 6th nerve palsy. Children are alert with no systemic upset. A bulging fontanelle, cracked pot sounds, or separation of the cranial sutures may be present. Papilloedema with an enlarged blind spot is the most consistent sign beyond infancy. Focal and neurological signs indicate a process other than pseudotumour cerebri. It may be complicated by optic atrophy and blindness. Most can be treated conservatively with monitoring of visual acuity. For others, multiple lumbar punctures may be necessary to reduce intracranial pressure. Very rarely are shunts required.

2- Which of the following forms of encephalitis is caused by a neuroimmunological response?

- 1) Herpes simplex [0]
- 2) Measles [100]
- 3) HIV infection [0]
- 4) Enteric viruses [0]
- 5) Cytomegalovirus [0]

Encephalitis may be caused by:

Direct invasion by a neurotoxic virus (encephalitis).

Post-infectious encephalopathy: delayed brain swelling because of an immunological response to the antigen.

Slow virus infection, e.g. HIV or SSPE.

Direct infection is most commonly caused by enteric viruses, HSV 1 and 2, varicella, CMV, and EBV. It is also occasionally caused by respiratory viruses, HHV6, rubella or mumps. A post-infectious illness may also be caused by measles or varicella zoster (cerebellar ataxia).

3- Which of the following clinical manifestations suggests Guillain Barré Syndrome?

- 1) Weakness beginning in the arms [0]
- 2) Asymmetrical involvement of distal muscles [0]
- 3) Bulbar involvement in about 50% of cases [100]
- 4) Brisk tendon reflexes [0]
- 5) Normal CSF protein [0]

GB is a post-infectious polyneuropathy causing demyelination in mainly motor but also sensory nerves. It usually follows a non-specific viral infection. Campylobacter and mycoplasma are recognised causes. Weakness begins in the legs and progressively ascends to involve the trunk, upper limbs and finally the bulbar muscles (Landry's ascending paralysis). Asymmetry is present in only 9% of patients, with symmetrical involvement being typical. Usually there is painless progression over days or weeks, but in cases of abrupt onset, there may be tenderness or muscle pain. Bulbar involvement occurs in 50%, with a risk of aspiration and respiratory insufficiency can be problematic. In the Miller Fisher Syndrome there is external ophthalmoplegia, ataxia and areflexia. In 20% of cases there is urinary incontinence or retention. Clinical symptoms usually improve within 2-3 weeks, though a chronic relapsing form is recognised. CSF protein is elevated to more than twice the upper limit of normal, with normal glucose and no pleocytosis. Bacterial cultures are negative and viral cultures rarely isolate anything. The dissociation between a high CSF protein and a lack of cellular response in a person with an acute or subacute polyneuropathy is diagnostic of Guillain Barré Syndrome.

4- A complete unilateral facial hemiparesis may be caused by which of the following?

- 1) An intracranial tumour [0]
- 2) Birth injury [100]
- 3) Cerebellar atrophy [0]
- 4) Myasthenia gravis [0]
- 5) Phenothiazine toxicity [0]

The facial nerve consists of 2 parts. The larger motor components supplies all the muscles of facial expression, while the smaller part (nervous intermedius) comprises the sensory and parasympathetic branches of taste from the anterior two thirds of the tongue, with efferent fibres to the lacrimal, submaxillary, and sublingual salivary glands. Unilateral upper motor neurone lesions (above the level of the pons) cause weakness more in the lower than in the upper part of the face, since upper facial structures receive bilateral innervation. A unilateral lower motor neurone lesion such as Bell's Palsy, affects the eyes as well. An intracranial tumour can, therefore, cause complete weakness only when both sides are affected. A forceps injury may compress the facial nerve.

5- Which of the following may cause a downbeat nystagmus?

- 1) Chiari type I malformation [100]
- 2) Unilateral medial longitudinal fasciculus lesion [0]
- 3) Central cerebellar lesion [0]
- 4) Wernicke's encephalopathy [0]
- 5) Aqueduct stenosis [0]

Nystagmus is defined as involuntary oscillations of the eyes. This may be pendular when the oscillations are equal in rate and amplitude; jerking - when there are quick and slow phases (the quicker phase is used to define the direction. Nystagmus may be caused by visual disturbances, lesions of the labyrinth or the central vestibular connections, or by brain stem or cerebellar lesions. Pendular nystagmus is usually due to loss of macular vision, but may be seen in diffuse brain stem lesions. Jerking nystagmus, which is of constant direction regardless of the direction of gaze, suggests a labyrinthine or cerebellar lesion. Nystagmus which changes with the direction of gaze suggests a widespread central involvement of vestibular nuclei. Jerking nystagmus present only on lateral gaze, and whose fast component is in the direction of gaze, indicates a lesion of the brain stem or cerebellum. Nystagmus confined to one eye suggests a peripheral lesion of the nerve or muscle, or a lesion of the medial longitudinal bundle. Nystagmus restricted to the abducting eye on lateral gaze (ataxic nystagmus) is due to a lesion of the medial longitudinal bundle between the pons and mid-brain as in MS. Nystagmus occurring on upward gaze with the fast component upwards (upbeat nystagmus) may be due to a lesion in the mid-brain at the level of the superior colliculus. Downbeat nystagmus (fast phase downwards) suggests a lesion in the lower part of the medulla. It is therefore, typical of the Arnold Chiari malformation.

6- Which of the following is a form of generalised seizure?

- 1) Aversive seizures [0]
- 2) Epilepsia partialis continua [0]
- 3) Automatisms [0]
- 4) Lennox Gastaut Syndrome [100]
- 5) Benign rolandic epilepsy [0]

Seizures may be classified as:

a) Partial

Simple partial (consciousness retained), motor, sensory, autonomic, psychic.

Complex Partial (consciousness impaired):

Simple partial followed by impaired consciousness, or consciousness impaired at onset.

Partial seizures with secondary generalisation

b) Generalised Seizures

Absences (typical or atypical).

Generalised tonic clonic.

Tonic.

Clonic.

Myoclonic.

Atonic.

Infantile spasms.

c) Unclassified Aversive seizures are a form of simple partial seizure, consisting of head turning and conjugate eye movements. Rasmussen's encephalitis is a sub-acute inflammatory encephalitis, and is one cause of epilepsy partialis continua. Complex partial seizures often contain automatisms which may be elementary (including lip smacking, chewing, swallowing or salivation), or automatic behaviour (semi-purposive uncoordinated or unplanned gestures including picking and pulling at clothing). Rolandic epilepsy is a benign partial epilepsy associated with centro-temporal spikes. There is an excellent prognosis.

7- Which is true regarding cerebral palsy?

1) The incidence is 2 per 100 live births. [0]

2) Visual impairment occurs in 50%. [0]

3) Hearing loss is present in 5%. [0]

4) Epilepsy is present in 40%. [100]

5) Learning impairment is present in 30%. [0]

Cerebral palsy is a disorder of movement and posture due to a non-progressive lesion of the motor pathways in the developing brain. The clinical manifestations tend to evolve with age. The incidence is 2 per 1000 live births, and other problems are common and are reflecting more widespread damage to the brain. These include:

Learning impairment in 60%.

Epilepsy in 40%.

Squints in 30%.

Hearing loss and visual impairment in 20%.

Speech and language disorders.

In addition, there may be considerable behavioural problems.

Obs & Gynae

1- A 15-year-old girl complained of anxiety and excessive sweating. She was not taking any medication.

Investigations showed:

TSH concentration 0.9 mU/L (0.5-3.4)
free T4 concentration 16 pmol/L (10-18)
total T4 concentration 180 nmol/L (55-145)
free T3 concentration 8.2 pmol/L (3.5-10.5)
total T3 concentration 3.3 nmol/L (0.9-2.5).

These results are compatible with which one of the following diagnoses?

- 1) Factitious thyrotoxicosis [0]
- 2) Familial dysalbuminaemic hyperthyroxinaemia [0]
- 3) Pregnancy [100]
- 4) Sick euthyroid syndrome [0]
- 5) Thyrotoxicosis [0]

The symptom complex is intentionally misleading. The patient has a normal TSH and normal free T3 and T4 concentrations, excluding thyrotoxicosis but elevated Total concentrations suggesting a rise in the binding globulins. This can occur in pregnancy. Sick euthyroidism would be typically associated with low thyroid hormone concentrations.

2- A 21 year old female with epilepsy is well controlled on sodium valproate 600mg bd and had been taking oral contraceptives for three years. She presented to her general practitioner 12 weeks pregnant.

Which of the following is correct?

- 1) An alternative anticonvulsant should be used in place of sodium valproate [0]
- 2) Interaction of sodium valproate with the oral contraceptive increased the risk of pregnancy [0]
- 3) The dose of sodium valproate should be increased [0]
- 4) There is an increased risk of a neural tube defect in her fetus [100]
- 5) She is at increased risk of anaemia in pregnancy [0]

There is an increased risk of neural tube defects associated with anti-convulsants during pregnancy. However, the risks associated with treatment are outweighed by the benefits in preventing seizures, so the drug should be continued. The risks may be minimised through use of folate supplements. Sodium valproate is not an enzyme inducer and would not speed up metabolism of the pill.

3- A 19 year old girl presents at the antenatal clinic. She is approximately six weeks pregnant and the pregnancy was unplanned. She has a two year history of grand mal epilepsy for which she takes carbamazepine. She has had no fits for approximately six months. She wants to continue with her pregnancy if it is safe to do so. She is worried

about her anticonvulsant therapy and the effects on the baby and enquires how she should be managed?

- 1) Advise termination due to drug teratogenicity [0]
- 2) Continue with carbamazepine [100]
- 3) Stop carbamazepine until the second trimester [0]
- 4) Switch therapy to phenytoin [0]
- 5) Switch therapy to sodium valproate [0]

The patient and fetus are at far more risk from uncontrolled seizures than from any potential teratogenic effect of the therapy. In pregnancy total plasma concentrations of anticonvulsants fall and so the dose may need to be increased. The potential teratogenic effects (particularly neural tube defects) of carbamazepine do need to be explained and in an effort to reduce this risk she should receive folate supplements. Screening with AFP and second trimester ultrasound are required. Vitamin K should be given to the mother prior to delivery. There is no point in switching therapies as this could precipitate seizures in an otherwise stable patient. Similarly, both phenytoin and valproate are again associated with teratogenic effects. (Further reading: Epilepsy in pregnancy)

4- Which of the following statements is true regarding smoking in pregnancy?

- 1) Smoking assists in maturation of the fetal lung. [0]
- 2) The reduction in birth weight is related to the number of cigarettes smoked per day. [100]
- 3) Maternal smoking may adversely affect testicular function in male children. [0]
- 4) Dysmorphic facies is a recognised complication. [0]
- 5) The newborn baby may require adjustments in drug dosages because of it. [0]

Smoking reduces birth weight which may be of critical importance if the baby is born pre-term. On average, the babies of smokers weigh 170g less than non-smokers, but the reduction in birth weight is related to the number of cigarettes smoked per day. Smoking is also associated with an increased risk of miscarriage and still birth. The infant has a greater risk of Sudden Infant Death Syndrome. There is some evidence that maternal smoking may adversely affect ovarian function in female children. No dysmorphic syndrome has yet been described.

5- Which of the following would be expected to reduce maternal mortality when given in eclampsia?

- 1) Insulin and dextrose infusion [0]
- 2) Low dose dopamine infusion [0]
- 3) Magnesium infusion [100]
- 4) Phenytoin infusion [0]
- 5) Salbutamol infusion [0]

Magnesium has been shown to significantly reduce maternal mortality in eclampsia and a favourable outcome may also be expected in pre-eclampsia. None of the other agents has been associated with a reduced mortality in eclampsia.

6- Regarding puerperal psychosis which of the following statements are true?

- 1) usually begins after the second week of the puerperium [0]
- 2) often takes the form of schizophrenia [0]
- 3) recurrence of puerperal psychosis in subsequent pregnancies is the rule [0]
- 4) the onset is usually insidious [0]
- 5) the prognosis is usually good [100]

Puerperal psychosis is a relatively rare complication of childbirth affecting 1 - 2 per 1000 births. (Postnatal depression is much commoner affecting 100 - 150 women per 1000 births). Puerperal psychosis is a mood disorder with features of loss of contact with reality, hallucinations, thought disorder and abnormal behaviour. It usually presents rapidly in the first month but most often starts in the first week. Prognosis is good.

Read more SIGN guideline 60.

<http://www.sign.ac.uk/pdf/sign60.pdf>

7- Which of the following drugs should not be prescribed for a breast-feeding mother?

- 1) Digoxin [0]
- 2) Erythromycin [0]
- 3) Tetracycline [100]
- 4) Theophylline [0]
- 5) Warfarin [0]

Tetracycline should be avoided in breast feeding mothers because of staining of the infant's teeth. Other drugs to be avoided include NSAIDs, amiodarone, lithium, chloramphenicol and Vitamin A derivatives.

Gynaecology

1- In the treatment of osteoporosis, which of the following best describe the drug Raloxifene?

- 1) A Bisphosphonate [0]
- 2) A Calcium Receptor Modulator [0]
- 3) An Estrogen [0]
- 4) A PTH receptor agonist [0]
- 5) A Selective Estrogen Receptor Modulator [100]

Raloxifene is the first of the so-called Selective Estrogen Receptor Modulators. There are fundamentally two types of estrogen receptor, alpha and beta, distributed at locations such as breast, uterus, bone and in the vasculature. Raloxifene acts as an estrogen agonist at some sites eg Bone to increase mineralisation but acts as an antagonist at other sites eg uterus/breast (preventing endometrial/breast hyperplasia).

Obstetrics

1- A diagnosis of diabetes mellitus is being considered in 32-year-old woman who is 16 weeks pregnant. Her body mass index (BMI) was 22 kg/m² (18 - 25). A 75g oral glucose tolerance test revealed:

Time Plasma glucose concentration

0 hr 6.0 mmol/l (3.0-6.0)

2hr 12.5 mmol/l (<11.1)

Which of the following is the most appropriate step in the management of this patient?

- 1) Low calorie diet [0]
- 2) Glipizide therapy [0]
- 3) Metformin therapy [0]
- 4) Repeat her oral glucose tolerance test in four weeks [0]
- 5) Insulin therapy [100]

The result confirms a diagnosis of gestational diabetes mellitus with the 2hr OGTT result above 11.1 mmol/l. To minimise the fetal consequences of GDM (macrosomia, fetal malformations, still birth, IUGR etc), the patient's glycaemia should be strictly controlled with insulin. A low calorie diet is inappropriate and neither metformin nor glipizide are licenced for use in pregnancy. There is no point in repeating the OGTT in 4 weeks as control is required NOW.

2- A 21 year old female with epilepsy is well controlled on sodium valproate 600mg bd and had been taking oral contraceptives for three years. She presented to her general practitioner 12 weeks pregnant.

Which of the following is correct?

- 1) An alternative anticonvulsant should be used in place of sodium valproate [0]
- 2) Interaction of sodium valproate with the oral contraceptive increased the risk of pregnancy [0]
- 3) The dose of sodium valproate should be increased [0]
- 4) There is an increased risk of a neural tube defect in her fetus [100]
- 5) She is at increased risk of anaemia in pregnancy [0]

There is an increased risk of neural tube defects associated with anti-convulsants during pregnancy. However, the risks associated with treatment are outweighed by the benefits in preventing seizures, so the drug should be continued. The risks may be minimised through use of folate supplements. Sodium valproate is not an enzyme inducer and would not speed up metabolism of the pill.

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Tetracycline should be avoided in breast feeding mothers because of staining of the infant's teeth. Other drugs to be avoided include NSAIDs, amiodarone, lithium, chloramphenicol and Vitamin A derivatives.

4- A diagnosis of diabetes mellitus is being considered in 32-year-old woman who is 16 weeks pregnant. Her body mass index (BMI) was 22 kg/m² (18 - 25). A 75g oral glucose tolerance test was reported as follows

time Plasma glucose concentration Normal range

0 hr 6.0 mmol/l 3.0-6.0

2hr 12.5 mmol/l <11.1

Which of the following is the most appropriate next step in the management of this patient?

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- 4) Metformin therapy [0]
- 5) Repeat OGTT in four weeks [0]

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- 2) Familial dysalbuminaemic hyperthyroxinaemia [0]
- 3) Pregnancy [100]
- 4) Sick euthyroid syndrome [0]
- 5) Thyrotoxicosis [0]

The symptom complex is intentionally misleading. The patient has a normal TSH and normal free T3 and T4 concentrations, excluding thyrotoxicosis but elevated Total concentrations suggesting a rise in the binding globulins. This can occur in pregnancy. Sick euthyroidism would be typically associated with low thyroid hormone concentrations.

7- The incidence of Down syndrome in children born to women aged less than 30 years is

- 1) 1:600 [0]
- 2) 1:800 [0]
- 3) 1: 1000 [0]
- 4) 1:1200 [100]
- 5) 1:1400 [0]

Maternal age also affects incidence of hydrocephalus, anencephaly and achondroplasia.

8- A 19 year old girl presents at the antenatal clinic. She is approximately six weeks pregnant and the pregnancy was unplanned. She has a two year history of grand mal epilepsy for which she takes carbamazepine. She has had no fits for approximately six months. She wants to continue with her pregnancy if it is safe to do so. She is worried about her anticonvulsant therapy and the effects on the baby and enquires how she should be managed?

- 1) Advise termination due to drug teratogenicity [0]
- 2) Continue with carbamazepine [100]
- 3) Stop carbamazepine until the second trimester [0]
- 4) Switch therapy to phenytoin [0]
- 5) Switch therapy to sodium valproate [0]

The patient and fetus are at far more risk from uncontrolled seizures than from any potential teratogenic effect of the therapy. In pregnancy total plasma concentrations of anticonvulsants fall and so the dose may need to be increased. The potential teratogenic effects (particularly neural tube defects) of carbamazepine do need to be explained and in an effort to reduce this risk she should receive folate supplements. Screening with AFP and second trimester ultrasound are required. Vitamin K should be given to the mother prior to delivery. There is no point in switching therapies as this could precipitate seizures in an otherwise stable patient. Similarly, both phenytoin

and valproate are again associated with teratogenic effects. (Further reading: Epilepsy in pregnancy)

<http://members.tripod.com/kinsei78/preg.htm>

9- A 26-year-old woman presented in acute shock at 35 weeks of pregnancy with profuse vaginal bleeding. She had suffered two previous miscarriages. She had a pulse of 110 beats per minute, blood pressure of 110/84 mmHg and no foetal heart sounds were audible.

Investigations revealed:

haemoglobin concentration 9.5g/dL (11.5 – 16.5)

platelet count 66 X 10⁹/L (150 – 400)

prothrombin time 21 s (11.5 – 15.5)

activated partial thromboplastin time (APTT) 52 s (30 – 40)

fibrinogen concentration 0.5 g/L (2 – 4)

What is the most appropriate next step in management?

- 1) antithrombin III infusion [0]
- 2) fibrinogen replacement infusion (cryoprecipitate) [100]
- 3) intravenous heparin [0]
- 4) platelet transfusion [0]
- 5) transfusion of two units group O Rhesus D negative blood [0]

The clinical picture is disseminated intravascular coagulation. When bleeding is the major problem, the aim is to maintain the prothrombin and activated thromboplastin time at a ratio of 1.5 times of the control and the fibrinogen level above 1g/L. Platelet transfusion is recommended if the count is less than 50 X 10⁹ /L. Anaemia is not very severe so in this case fibrinogen replacement would be the appropriate choice. (Ref: Oxford textbook of Medicine)

Oncology

1- A 58-year-old man presents with weight loss and haemoptysis. He has smoked most of his life. On examination he is clubbed and has clinical evidence of right pleural effusion. His serum calcium is 3.2mM. Which of the following histological type of lung cancer is he most likely to suffer from?

- 1) mesothelioma [0]
- 2) small cell carcinoma [0]
- 3) large cell carcinoma [0]
- 4) squamous cell carcinoma [100]
- 5) adenocarcinoma [0]

Hypercalcaemia in absence of bony metastases occurs in about 15% of squamous cell lung carcinoma from parathyroid hormone related protein (PTHrP) production. This is a feature of non-metastatic manifestation of malignancy. Inappropriate ADH secretion (hyponatraemia) and ectopic ACTH production (Cushings syndrome) occur with small cell lung cancer. Clubbing is predominantly associated with squamous cell cancers and occasionally adenocarcinoma.

2- Which of the following is an oncogene?

- 1) The N-Myc gene [100]
- 2) The WT1 (first Wilm's tumour) gene [0]
- 3) The Retinoblastoma gene [0]
- 4) The WT2 (second Wilm's tumour) gene [0]
- 5) The BCRabI translocation (Philadelphia chromosome) [0]

Oncogenes are endogenous human DNA sequences that arise from normal genes called proto-oncogenes. Proto-oncogenes are normally expressed in many cells, particularly during fetal development, and are thought to play an important regulatory role in cell growth and development. Alterations in the proto-oncogene can activate an oncogene, which produces unregulated gene activity, contributing directly to tumourogenesis. Oncogene alterations are important causes of:

Rhabdomyosarcomas (ras oncogene).

Burkitt's lymphoma (C-myc is translocated intact from its normal position on chromosome 8 to chromosome 14).

Neuroblastoma (N-myc proto-oncogene is seen in a proportion of patients with poor prognosis).

They should be contrasted with tumour suppressor genes. In this situation, the genes normally down regulate cell growth, and require inactivation to allow malignant growth. Examples include retinoblastoma.

3- Which of the following does not have a role in the management of chronic cancer pain?

- 1) Carbamazepine [0]
- 2) Clodrinat [0]
- 3) Dexamethasone [0]
- 4) Nifedipine [0]
- 5) Pinavarium [100]

Pinavarium is used to reduce the pain duration in irritable bowel syndrome (IBS).

Carbamazepine is in use for the treatment of neuropathic pain of malignancy, diabetes and other disorders. Clodrinat inhibits osteoclastic bone resorption and is used to treat malignant bone pain and the associated hypercalcaemia. The corticosteroids are used to treat pain from central nervous system tumours. Reducing the inflammation and oedema relieves the pain caused by neural compression. Nifedipine helps relieve painful oesophageal spasm and tenesmus associated with gastrointestinal tumours. Painful bladder spasm may be relieved by oxybutinin.

4- A 64-year-old man is found to have squamous cell bronchogenic carcinoma. Which of the following statements is true regarding surgical resection?

- 1) An FEV1 of 2 L is a major contraindication to surgical resection. [0]
- 2) Hypercalcaemia makes further assessment for surgery unnecessary. [0]
- 3) Is precluded if a CT scan of the thorax shows enlarged mediastinal lymph nodes. [100]
- 4) Positive sputum cytology excludes the need for bronchoscopic examination of the airways. [0]

5) The presence of finger clubbing indicates that liver metastases are already present. [0]

Mediastinal lymphadenopathy is usually associated with a poor prognosis, although there may be a role for surgery and adjuvant chemotherapy in those with metastasis to ipsilateral mediastinal lymph nodes and subcarinal lymph nodes (N2).

Bronchoscopy is useful to identify involvement of carina or if tumour is within 2 cm of the carina which means the cancer is inoperable.

Patients are clearly operable on the basis of spirometry if FEV1 is greater than 1.5 litres for lobectomy and greater than 2 litres for pneumonectomy. For those with worse spirometric function may need full pulmonary function including transfer factor, and exercise testing.

Finger clubbing is related to HPOA, which is a non-metastatic manifestation of malignancy.

Hypercalcaemia may be associated with parathyroid-hormone related peptide production associated with squamous cell carcinoma (non-metastatic manifestation of malignancy).

5- An elderly lady with breast cancer is starting diamorphine elixir for painful bony metastases. Which of the following is the most appropriate comment to make to her caregiver.

- 1) Sedation is likely to be an ongoing problem with diamorphine [0]
- 2) If pain relief is not adequate cocaine may need to be introduced [0]
- 3) A laxative will need to be used [100]
- 4) Dependence on diamorphine is likely and could cause problems [0]
- 5) The same dose could be given IM to achieve the same effect. [0]

A laxative should always be started in conjunction with narcotics to avoid distressing constipation. Sedation occurring in the first few days typically wears off. If pain relief is inadequate the dose should be increased, cocaine may produce hallucinations. Addiction is not an issue in the terminally ill. IM is 3 times more effective than the same oral dose.

6- B cell CLL

- 1) thrombocytopenia often autoimmune [0]
- 2) reduced immunoglobulins are a risk for recurrent bacterial infections [100]
- 3) Stage A disease should be treated with chemotherapy [0]
- 4) late transformation to ALL occur in the majority of patients [0]
- 5) diffuse infiltration of bone marrow indicates good prognosis [0]

Immune thrombocytopenia only in 2%. Hypogammaglobulinaemia predisposes to encapsulated bacteria eg pneumococcus/H influenzae - causes death in 30% cases. Two transformations in CLL - CLL/PL (10%) and Richter syndrome (5% = high

grade non-hodgkins lymphoma). Treatment only for Stage B, C and A with clear evidence of progression.

7- A 45-year-old woman noticed tinnitus in her left ear which progressed over some weeks to hearing loss in that ear. On physical examination she is found to have a marked decrease in hearing on the left, with Rinne test indicating air conduction better than bone conduction. The other cranial nerves I - VII and IX - XII are intact. A brain MRI scan revealed a solitary, fairly discrete, 3 cm mass located in the region of the left cerebellopontine angle. Which of the following statements is most appropriate to tell the patient regarding these findings?

- 1) A test for HIV-1 is likely to be positive [0]
- 2) Other family members should undergo MR imaging of the brain [0]
- 3) Remissions and exacerbations are likely to occur in coming years [0]
- 4) The lesion can be resected with a good prognosis [100]
- 5) You are unlikely to survive for more than a year [0]

These acoustic neuromas are benign neoplasms. A solitary mass is unlikely to be part of neurofibromatosis (which could be familial).

8- A 48-year-old woman presents to her GP with Cushingoid facies and hyperpigmentation of the skin on her face and chest. She has smoked 20 cigarettes per year for 30 years. Examination reveals no gross abnormalities. Her chest X-ray reveals a 2 cm irregularly shaped mass in the right upper lobe, in proximity to the mediastinum. A CT guided needle biopsy of the lung lesion is performed. Which would be the most likely cytologic finding?

- 1) Adenocarcinoma [0]
- 2) Benign bronchial adenoma [0]
- 3) Bronchoalveolar cell carcinoma (BAC) [0]
- 4) Small cell (oat cell) carcinoma [100]
- 5) Squamous cell carcinoma [0]

9- A firm 2 to 3 cm mass is palpable in the upper outer quadrant of the right breast of a 52-year-old woman. There are no palpable axillary lymph nodes. A lumpectomy with axillary node dissection is performed and the breast lesion is found to have positive immunohistochemical staining for HER2/neu (c-erb B2). Staining for oestrogen and progesterone receptors is negative. Which of the following additional treatment options is most appropriate, based upon these findings?

- 1) Radical mastectomy [0]
- 2) St John's wort [0]
- 3) Tamoxifen [0]
- 4) Trastuzumab [100]
- 5) Vancomycin [0]

This is an infiltrating ductal carcinoma. The lack of Oestrogen Receptor staining suggests a poor response to hormonal therapy with tamoxifen. The positive C-erb B2 (HER2/neu) staining suggests that trastuzumab (Herceptin) may be effective.

10- Which one of the following statements is true of B cell CLL?

- 1) Autoimmune thrombocytopenia is uncommon [100]
- 2) reduced immunoglobulins a risk of recurrent viral infections [0]
- 3) Stage A disease should be treated with chemotherapy [0]
- 4) late transformation to ALL occur in the majority of patients [0]
- 5) diffuse infiltration of bone marrow indicates good prognosis [0]

Immune thrombocytopenia occurs in only 2% of cases. Hypogammaglobulinaemia predisposes to encapsulated bacteria eg pneumococcus/H influenzae - causes death in 30% cases. Two transformations in CLL - CLL/PL (10%) and Richter' syndrome (5% = high grade non-hodgkins lymphoma). Treatment only for Stage B, C and A with clear evidence of progression.

11- Which of the following associations is correct?

- 1) Renal transplantation and Non-Hodgkin's lymphoma [0]
- 2) Hepatitis B and aplastic anaemia [100]
- 3) Turner's syndrome and acute myeloid leukaemia [0]
- 4) Basophilia and chronic myeloid leukaemia [0]
- 5) Crohn's disease and TB [0]

Post-renal transplant complications include:

Renal: acute tubular necrosis, acute and chronic rejection, technical urological or urovascular problems, recurrence of the original renal disease, urinoma.

Drug toxicity (immunosuppressives, antibiotics).

Infection (particularly viral e.g. CMV, systemic), wound or urinary tract infection.

Bleeding.

Pancreatitis, lymphocele, bowel obstruction. Aplastic anaemia may be acquired or congenital.

Congenital causes:

Fanconi anaemia, reticular dysgenesis, Schwachman-Diamond Syndrome, dyskeratosis congenita, familial aplastic anaemia, preleukaemias, myodysplasia, monosomy 7, non-haematological syndromes (Down's, Seckle, Dubowitz).

Acquired causes:

Idiopathic

Secondary:

Radiation, drugs and chemicals (either predictable or idiosyncratic).

Viruses: EBV, hepatitis, parvovirus, HIV.

Immunological diseases: eosinophilic fascitis, hypogammaglobulinaemia, thymoma.

Other: pregnancy, paroxysmal nocturnal haemoglobinuria, preleukaemia.

AML constitutes 20% of all childhood leukaemias, but is the predominant in the neonatal period. It has an increased incidence in Down's Syndrome, Fanconi anaemia, Diamond-Blackfan anaemia, Kostmann Syndrome and Bloom Syndrome. It also occurs in children treated for a previous leukaemia, with a peak incidence within 10 years of the initial malignancy. This may be related to alkylating agents, agents that inhibit DNA repair, or radiation therapy. CML is a clonal malignancy of the haematopoietic stem cell characterised by a specific location, the t(9;22) (q34;q1), known as the Philadelphia chromosome. This juxtaposition produces a fusion gene.

CML is rare in children, accounting for only 3% of childhood leukaemia. In most cases there is no predisposing feature. The films shows elevated white cell counts (which may exceed 105 per mm³, with all forms of myeloid cells seen in the blood smear. Platelet count may be elevated, and the bone marrow is hypercellular. Cytogenetic and molecular studies demonstrating the Philadelphia chromosome confirm the diagnosis. Currently, there is no evidence to link Crohn's disease with TB.

12- Concerning Neurofibromatosis Type 1 (NF1), which one of the following statements is true?

- 1) Bilateral acoustic neuromas are common [0]
- 2) Clinical severity in individuals is similar in a given family [0]
- 3) New mutations occur rarely [0]
- 4) Pigmented spots on the iris are a characteristic feature [100]
- 5) The diagnosis is likely if two café-au-lait patches are present [0]

Lisch nodules of the iris are present in more than 90% of patients.

Bilateral acoustic neuromas is a hallmark feature of neurofibromatosis type 2.

Expressivity of the gene is highly variable and members of the same family usually show wide differences in clinical symptoms.

NF1 is one of the most common autosomal dominant conditions. However almost half of all cases give no family history and are new mutations. The mutation rate is estimated to be 1:10,000 gametes.

The diagnosis is suggested by six or more café- au- lait macules (spots), each over 5 mm in diameter in prepubescent individuals and over 15 mm in postpubertal individuals.

13- Regarding retinoblastoma which of the following statements is correct?

- 1) Bilateral involvement is found in 70% of cases. [0]
- 2) The predisposition may be inherited as an autosomal dominant condition. [0]
- 3) There is an increased risk of autoimmune disease. [0]
- 4) They have often metastasised by the time of diagnosis. [0]
- 5) They usually present with leukocoria. [100]

The incidence is 1 in 16,000 live births. Genetic predisposition occurs in 20% of patients with unilateral disease, and 30% of patients with bilateral disease. The gene has been localised to 13q and the inherited form is associated with an increased risk of malignancy such as osteosarcoma and pineal tumours. The commonest presentation is leukocoria (yellowish white pupil reflex), and there may be diminished or absent vision or strabismus. Late symptoms are pupil irregularity, hyphema, pain, proptosis, and signs of raised intracranial pressure. The tumours have rarely metastasised before they are detected.

14- Which of the following regarding salivary gland pleomorphic adenomas is correct?

- 1) they are the most common salivary gland tumor [100]
- 2) are commoner in the sub-mandibular than the parotid gland [0]
- 3) in the parotid gland most commonly arise medial to the facial nerve [0]
- 4) are more common in males than in females [0]
- 5) Typically enhance following intravenous contrast injection in CT [0]

a-They are the most common salivary gland tumor representing 70% to 80% of all benign salivary gland tumors b-84% occur in parotid gland c-90% of parotid gland pleomorphic adenomas arise lateral to facial nerve d-They occur most often in women over 40 e-Usually they do NOT enhance (Dr Martin Schranz)

15- Which of the following statements regarding lymphomas in childhood is correct?

- 1) Hodgkin's disease is more common than non-Hodgkin's under the age of 5 years. [0]
- 2) Hodgkin's disease has equal sex incidence. [0]
- 3) lymphocyte-predominant Hodgkin's disease has the worse prognosis. [0]
- 4) the nodular sclerosing variety is the most common form of Hodgkin's disease. [100]
- 5) the most common presenting clinical sign is splenomegaly. [0]

Hodgkin's lymphoma occurs in four forms: (1) lymphocyte-predominant (10-20%) with the best prognosis; (2) nodular sclerosing (50%) which is the most common form; (3) mixed cellularity (40-50%) which is most likely to have extranodal disease at presentation; and (4) lymphocyte depleted (<10%) which is the rarest type with the worst prognosis. Hodgkin's disease is rarely found in children aged less than 5 years old (male:female ratio=2:1) and peaks at between 15 and 34 years. Non-Hodgkin's disease is more common in younger children (male:female ratio=3:1). The most common presenting clinical sign is enlarged cervical lymph nodes. From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 15 © WB Saunders. Reproduced with permission.

16- A 65-year-old man, with a history of smoking, presents with chronic cough, haemoptysis and weight loss. His Chest X-Ray shows a cavitating lesion. What is the likely diagnosis?

- 1) adenocarcinoma [0]
- 2) alveolar cell carcinoma [0]
- 3) large cell carcinoma [0]
- 4) small cell carcinoma [0]
- 5) squamous cell carcinoma [100]

Squamous cell carcinomas characteristically present with cavitating lung lesions on Chest X-Ray and metastasize late. Other causes of cavitating lung lesions include infection (Staphylococcus aureus, tuberculosis, Klebsiella, Pneumocystis carinii), pulmonary infarcts, Wegener's Granulomatosis and Rheumatoid nodules.

17- In asbestos related disorders which of the following statements is correct?

- 1) basal fibrotic shadowing on CXR suggests coincidental idiopathic fibrosing alveolitis [0]
- 2) increased incidence of primary lung cancer [100]
- 3) pleural effusion develops more than 20 years after causative asbestos exposure [0]
- 4) pleural plaques are recognized precursors of mesothelioma [0]
- 5) the risk of malignant mesothelioma is greatly increased in smokers compared with non-smokers [0]

The risk of mesothelioma is not affected by smoking but smoking and asbestos exposure greatly increases the risk of lung cancer. It is pleural plaques which do not become apparent until 20 years or more after exposure. Pleural effusions may result from acute asbestos pleurisy. Pleural plaques are not precursors of malignant change, but they reflect previous asbestos exposure. Basal fibrotic changes suggest the presence of asbestosis as the fibres are fibrogenic.

18- Carcinoid tumors of the lung (bronchial adenomas) originate from which of the following cell types?

- 1) Ciliated cell [0]
- 2) Clara cell [0]
- 3) Kulchitsky (K) cell [100]
- 4) Mucus (goblet) cell [0]
- 5) Type 2 Alveolar cell [0]

19- A 75-year-old man with squamous cell carcinoma is thought to have resectable disease. Which of the following would be a contraindication to surgery?

- 1) clubbing [0]
- 2) FEV1 of 0.75 L [100]
- 3) his age of 75 years [0]
- 4) pleural effusion [25]
- 5) Syndrome of Inappropriate ADH [0]

Contraindications to surgery are proven metastases, mediastinal organ involvement, malignant pleural effusion (i.e. straw coloured, reactive effusions are not a contraindication if cytology is negative), contralateral mediastinal node involvement, FEV1 < 0.8 L, severe cardiac or other significant disease (e.g. cerebrovascular, renal, liver etc.).

20- A 59 year old female smoker is diagnosed with oat cell carcinoma of the bronchus. Which of the following relating to this diagnosis is true?

- 1) The tumour is likely to be radiosensitive [0]
 - 2) occurs with equal frequency in smokers and non-smokers [0]
 - 3) has a 5 year survival greater than 20% [0]
 - 4) Is associated with the elaboration of ectopic ADH secretion [100]
 - 5) Is typically associated with ectopic parathormone secretion. [0]
-

a - it is very radioresistant b - adenocarcinoma is not cigarette dependent c - the 5 year survival rate is less than 5% d - due to inappropriate secretion of antidiuretic hormone e- Squamous cell carcinoma classically elaborates PTHrp (Cornwall Trainers)

21- Mutations of the p53 gene frequently occur in:

- 1) Huntingdon's Disease [0]
- 2) Type 2 Diabetes Mellitus [0]
- 3) Cystic fibrosis [0]
- 4) Bronchial Carcinoma [100]
- 5) Colonic polyps [0]

p53 is a tumour suppressor gene and inactivating mutations of this gene occur in a large proportion of human cancers.

22- The following statement is true of sarcoidosis

- 1) Prognosis is poor when sarcoidosis presents acutely with bilateral hilar lymphadenopathy and erythema nodosum [0]
- 2) hypercalcaemia due to increased renal synthesis of 1-hydroxylase [0]
- 3) serum angiotensin converting enzyme (ACE) is useful for diagnosis of sarcoidosis [0]
- 4) It can produce Mikulicz's syndrome [100]
- 5) Central caseation occurs in the sarcoid granuloma [0]

a) Lofgren's syndrome is the combination of erythema nodosum and bilateral hilar lymphadenopathy (Stage 1 radiograph). The prognosis is good with 80% resolving spontaneously, and have a normal CXR after 1 year. b) Hypercalcaemia (2-10%) and hypercalciuria (up to 50%) are well recognised in sarcoidosis. The pattern resembles hypervitaminosis D, with elevated serum calcium, normal serum phosphate and normal/slightly raised alkaline phosphatase. There is elevated 1,25-dihydroxycholecalciferol due to increased production by alveolar pulmonary macrophages and macrophages in granulomata. Treat with rehydration and corticosteroids. c) Serum ACE is produced by sarcoid granulomata from activation and differentiation of monocyte-macrophage system. It is a membrane bound glycoprotein, found mainly in the lung capillary endothelium. ACE has poor diagnostic sensitivity (ability to detect disease) and specificity (ability to exclude disease), but is raised in active sarcoidosis. It is useful in monitoring of disease activity. d) Mikulicz's syndrome is the enlargement of lacrimal glands and parotid glands, caused by sarcoidosis. Other causes include lymphoma and leukaemia. e) Sarcoidosis is chronic multisystem non-caseating granulomatous disease. Central fibrinoid necrosis may occur, but tends to be focal and limited unlike the purulent necrosis/caseation seen in tuberculosis

23- A 30-year-old woman has a right mastectomy and axillary lymph node dissection for a carcinoma diagnosed by fine needle aspiration cytology. The histologic pattern is that of a poorly differentiated carcinoma that is negative for oestrogen and progesterone receptors, but is positive for HER2/neu. One axillary lymph node demonstrates micro-metastases. Her 32 year old sister is found to have a similar

lesion. Which of the following statements regarding risk factors for this lesion is the most appropriate?

- 1) A history of late menarche is likely to be present in females in this family [0]
- 2) Fibrocystic changes were present for many years [0]
- 3) She had a history of exposure to hydrocarbon compounds [0]
- 4) She has a positive antinuclear antibody test [0]
- 5) These findings suggest a BRCA-1 mutation [100]

A small number of breast cancers are the result of an inherited BRCA-1 mutation (or BRCA-2), but the family history of breast cancer at a young age makes this more likely. Early menarche and late menopause and nulliparity are risks for breast cancer. Autoimmune diseases do not appreciably increase the risk for breast cancer.

24- A 56-year-old woman is recently diagnosed with small cell carcinoma of the lung. Which of the following non-metastatic manifestations is she most likely to develop?

- 1) myasthenia gravis [0]
- 2) Eaton-Lambert syndrome [100]
- 3) ectopic PTH-related peptide secretion [0]
- 4) erythema gyratum repens [0]
- 5) hypertrophic pulmonary osteoarthropathy (HPOA) [0]

Non-metastatic paramalignant manifestations for small cell carcinoma include inappropriate ADH and ectopic ACTH secretion, Eaton-Lambert syndrome (70% occurs in association with small cell carcinoma - autoimmune disorder affecting release of acetylcholine at neuromuscular junction causing proximal muscle weakness, fatiguability and muscle wasting. Often, power is increased initially by exercise = reversed myasthenis effect. Weakness and fatiguability can be improved with guanidine hydrochloride), polymyositis, dementia, cerebellar syndrome and peripheral neuropathy. Cutaneous lesions (dermatomyositis, thrombophlebitis migrans, acanthosis nigricans and erythema gyratum repens) are rare. HPOA and ectopic PTH-related peptide secretion relates particularly to squamous cell carcinoma.

25- In which of the following cases of lung cancer would surgical resection of the tumour be a reasonable therapeutic option?

- 1) A 56-year-old woman with an adenocarcinoma of the right lung. CT scan shows enlarged lymph nodes in the right and left hilum. PFTs show an FEV1 of 2.25 L. (55% predicted). [0]
- 2) A 59-year-old man who is found at bronchoscopy to have a tumour in the right mainstem bronchus extending to within 1 cm of the carina. Pulmonary Function Tests (PFTs) show an FEV1 of 2.1 liters (65% of predicted normal). [0]
- 3) A 62-year-old lady with a small peripheral mass who has elevated liver enzymes and a computed tomography (CT) scan showing probable metastatic deposits in the liver PFTs show an FEV1 of 3.5 Liters (80% of predicted normal). [0]
- 4) A 70-year-old man with a right lower lobe tumour 2 cm in diameter with no evidence of regional adenopathy or distant spread of disease. PFTs show an FEV1 of 0.8 Liters (28% predicted). [0]
- 5) A 71-year-old man with a 3 cm tumor obstructing the right lower lobe bronchus. PFTs show an FEV1 of 1.98 L. (43% predicted). [100]

26- A 60-year-old man was diagnosed last year with adenocarcinoma of the lung, and a 4 cm mass lesion was treated with a right lower lobectomy. He now has an abdominal CT scan that reveals scattered hepatic mass lesions and hilar lymphadenopathy. For several weeks, he has had increasing malaise. A urinalysis reveals marked proteinuria, and a 24 hour urine protein collection is 2.7 g/24hr. His serum urea is 30 mmol/L (2.5 - 7.5) with creatinine of 450 µmol/L (60 - 110). A renal biopsy is performed, and there is focal deposition of IgG and C3 with a granular pattern. He is most likely to have which of the following conditions?

- 1) Goodpasture's syndrome [0]
- 2) Membranous glomerulonephritis [100]
- 3) Minimal change glomerulonephritis [0]
- 4) Nodular glomerulosclerosis [0]
- 5) Rapidly progressive glomerulonephritis [0]

Most cases of membranous GN are idiopathic, but in some patients there is a history of an infection or a malignancy (usually lung) with antigenemia.

27- A 56-year-old man from Thailand presented with abdominal pain and a mass in the right upper quadrant. He reported that he had been diagnosed with viral hepatitis several years previously. Investigations showed:

Serum alpha-fetoprotein 13,500 IU/L (< 10)

What is the most likely underlying viral infection?

- 1) Hepatitis A virus [0]
- 2) Hepatitis B virus [100]
- 3) Hepatitis C virus [0]
- 4) Hepatitis D virus [0]
- 5) Hepatitis E virus [0]

Very difficult! The patient has chronic viral hepatitis and presents with a hepatoma. The underlying cause must be either HBV or HCV. There is a higher prevalence of HBV in the Far East and since his country of origin is the only other detail that gives a clue to the cause of his hepatitis, the most likely viral agent is HBV.

28- A 64-year-old man has terminal cancer with hepatic metastases. He is treated with oral morphine (Oramorph) solution for pain relief.

Which is the most important pharmacodynamic factor in determining the appropriate timing between doses?

- 1) bioavailability [0]
 - 2) first pass metabolism [100]
 - 3) gastric emptying [0]
 - 4) plasma half-life [0]
 - 5) renal clearance [0]
-

Morphine undergoes extensive first pass metabolism in the liver. And it has got effect on bioavailability and plasma half-life. Oral morphine is well absorbed.

29- A 51-year-old woman has had several syncopal episodes over the past year. Each episode is characterized by sudden but brief loss of consciousness. She has no chest pain. She has no ankle edema. On brain MRI there is a 1.5 cm cystic area in the left parietal cortex. A chest X-ray shows no cardiac enlargement, and her lung fields are normal. Her serum total cholesterol is 6.5 mmol/L. Which of the following cardiac lesions is she most likely to have?

- 1) Cardiac amyloidosis [0]
- 2) Ischemic cardiomyopathy [0]
- 3) Left atrial myxoma [100]
- 4) Mitral valve prolapse [0]
- 5) Tuberculous pericarditis [0]

Atrial myxomas are more often on the left. Though benign, they can occlude the mitral valve and produce sudden loss of cardiac output. They may embolize small portions of themselves or thrombus formed over their surface.

30 -Which of the following statements regarding prognosis in lung cancer is true?

- 1) Combined modality therapy (chemotherapy, radiation therapy and surgery) has improved overall lung cancer survival to 40% at 5 years. [0]
- 2) Overall lung cancer survival is < 15% at 5 years. [100]
- 3) Patients undergoing radiation therapy have a 5 year survival of 40%. [0]
- 4) Patients who qualify for surgery have a 50% 5 year survival. [0]
- 5) With chemotherapy, overall survival in small cell (oat cell) carcinomas has risen to 60% at 5 years. [0]

31- A 45-year-old man develops facial swelling and breathlessness. His chest X-ray reveals paratracheal lymphadenopathy. Which of the following statements is most accurate regarding the superior vena caval obstruction?

- 1) the most common cause is squamous cell carcinoma [0]
- 2) treatment of choice is radiotherapy [0]
- 3) it may be associated with voice hoarseness [100]
- 4) it is associated with Kussmaul's sign [0]
- 5) the commonest symptom is stridor [0]

a) SVCO is most likely caused by bronchogenic carcinoma, especially small cell carcinoma (10% small cell cancers present with SVCO) due to mediastinal lymphadenopathy. Other causes include lymphoma, aortic aneurysm, mediastinal fibrosis and mediastinal goitre. b) Chemotherapy ± radiotherapy is the treatment of choice in small cell carcinoma. Radiotherapy may be the treatment of choice for non-small cell carcinoma. Median survival of lung cancer presenting with SVCO, even with treatment is 5 months. Lymphoma has better prognosis and will require specific chemotherapy ± radiotherapy c) Recurrent laryngeal nerve palsy usually occurs with malignant tumour but can occur with aneurysm of aortic arch. There may also be Horner's syndrome due to involvement of sympathetic chain. Compression of vital structures can result in stridor and dysphagia. d) SVCO is associated with elevated

non-pulsatile jugular venous pressure. Kussmaul's sign is the paradoxical rise in JVP on inspiration due to constrictive pericarditis or significant pericardial effusion. e) The commonest symptoms are usually cough and chest pain, due to the distortion of mediastinal anatomy. Physical signs are often absent or minimal, but classically there is facial and periorbital oedema, chemosis and distended veins.

32- Which of the following is associated with a GH secreting pituitary tumour

- 1) Gs alpha subunit mutation [100]
- 2) Pit-1 mutation [0]
- 3) H-ras mutation [0]
- 4) Rb 1 mutation [0]
- 5) p53 mutation [0]

A stimulatory mutation of the Gs protein alpha subunit has been noted in approximately 30% of GH secreting pituitary tumours.

33- Which ONE of the following statements regarding colon cancer is correct:

- 1) In non-familial cases, gene mutations in the cancer cells are unusual [0]
- 2) In familial cases the inheritance pattern is typically autosomal recessive [0]
- 3) It occurs most commonly in the ascending colon [0]
- 4) It is a characteristic feature of the Peutz-Jegher syndrome [0]
- 5) In familial polyposis coli the increased cancer risk is due to inheritance of a mutated suppressor gene [100]

A – Quantitative and qualitative alterations in gene expression accumulate in colorectal cancer cells. These include alterations of pro-oncogene expression and chromosomal abnormalities (deletions at 17p and 18q are seen in 70% of colorectal carcinomas). B – Both familial polyposis coli and Gardner's syndrome are autosomal dominant. C – The rectum and sigmoid colon are the commonest sites. D – Peutz-Jegher's syndrome is dominantly inherited pigmentation of skin and mucuous membranes, and hamartomatous polyps in the stomach and larger intestine. The polyps only rarely undergo malignant change. E – An allelic deletion of a putative tumour suppressor gene on 5p.

34- The following are recognized features of Pancoast's tumour except:

- 1) ipsilateral Horner's syndrome [0]
- 2) wasting of the dorsal interossei [0]
- 3) pain in the arm radiating to the fourth and fifth fingers [0]
- 4) erosion of the first rib [0]
- 5) weakness of abduction at the shoulder [100]

The tumour causes pain in the C8 and T1 distribution and Horner's syndrome. It may cause small muscle wasting of the hands and erosion of 1st rib. The nerve root for abduction of shoulder is C5.

35- Which of the following concerning diamorphine elixir for the relief of pain in terminal patients is correct?

- 1) Analgesia is enhanced if cocaine is added [0]
- 2) Constipation is a characteristic sequel to treatment [100]
- 3) Dependence occurs rapidly [0]
- 4) initial sedation typically continues whilst the drug is administered [0]
- 5) the same amount of pain relief is produced as when the same dose is given via intramuscular injection [0]

Sedation occurring in the first few days typically wears off, leaving the patient alert. Hallucinations also tend to occur. An aperient should always be added to the treatment regime. Addiction is not a problem. An intramuscular injection is three times more effective than the same oral dose (Cornwall Trainers)

Opthalmology

1- Which of the following may be associated with optic atrophy?

- 1) XXY karyotype [0]
- 2) Low plasma caeruloplasmin [0]
- 3) Anti-Acetylcholinesterase antibodies [0]
- 4) Red Ragged fibres on muscle biopsy [100]
- 5) Intense iron deposition on liver biopsy [0]

Mitochondrial myopathy is found in Kearns-Sayre syndrome, MELAS and Leber's optic atrophy. Wilson's disease is associated with KF rings and myotonic dystrophy rather than myasthenia Gravis is associated with OA. OA is not associated with Klinefelter's disease.

2- Which ONE of the following diagnoses is associated with acute Iritis?

- 1) keratoconus [0]
- 2) Lyme disease [0]
- 3) osteogenesis imperfecta [0]
- 4) Psoriatic arthropathy [100]
- 5) Refsum's disease [0]

Iritis is associated with conditions such as Reiter's, Behcet's, Psoriatic arthropathy (about 20%) and inflammatory bowel disease. A chronic iritis is rarely described in association with Lyme disease. Osteogenesis imperfecta is associated with blue sclera. Keratoconus, meaning "cone shaped," describes a condition in which the cornea (the clear front window of the eye) becomes thin and protrudes. This abnormal shape can cause serious distortion of visual images. It is not associated with iritis. Refsum's disease is associated with retinitis pigmentosa.

3- A 23-year-old man presents with visual loss in the right eye, diagnosed as optic neuritis.

Which one of the following statements would be seen in an afferent pupillary defect?

- 1) accommodation response is unaffected [100]
- 2) hypersensitive response to pilocarpine in the affected eye [0]
- 3) irregular pupil of the affected eye [0]

- 4) pupil of affected eye larger than the unaffected eye [0]
- 5) pupil of affected eye smaller than the unaffected eye [0]

Optic neuropathy DOES NOT cause any abnormalities of the shape or size of the pupil. However the light reaction is diminished. Accommodation is normal.

4- A 22 year old female presents with a month history of episodic, brief visual loss affecting the right eye. Over the last one year she had gained a considerable amount of weight. Examination reveals a BMI of 35, with bilateral optic disc swelling, worse on the right and small retinal haemorrhages on the right.

What is the most likely diagnosis?

- 1) benign intracranial hypertension [100]
- 2) Craniopharyngioma [0]
- 3) Graves' Ophthalmopathy [0]
- 4) Optic neuritis [0]
- 5) sagittal sinus thrombosis [0]

This is a classic description of BIH. Drugs such as tetracyclines, the oral contraceptive or pregnancy may be contributory.

5- A patient presented with a quadrantic hemianopia. Which of the following conditions is most likely to cause such a presentation?

- 1) a lesion of the occipital cortex [100]
- 2) a lesion of the optic chiasma [0]
- 3) bilateral diabetic retinopathy [0]
- 4) chloroquine poisoning [0]
- 5) tobacco amblyopia [0]

A lesion of the optic chiasma would cause a bitemporal hemianopia. Diabetic retinopathy may cause an "apparent quadrantic hemianopia" because the distribution of the retinal changes may just correspond to quadrantic hemianopia - but this is not the most likely. Tobacco amblyopia causes symmetric central or centrocaecal scotomas. Chloroquine poisoning causes symmetric bilateral scotomas.

6- A 30-year-old female presents to the eye clinic with an acute history of pain and blurring in the right eye. Examination reveals a visual acuity of 6/36 in the right eye but 6/6 in the left eye, a central scotoma in the right eye, with a right swollen optic disc.

What is the most likely diagnosis?

- 1) Compression of the optic nerve [0]
- 2) Cavernous sinus thrombosis [0]
- 3) Glaucoma [0]
- 4) Optic neuritis [100]
- 5) Retinal vein occlusion [0]

The acute presentation with central scotoma, reduced visual acuity and a swollen optic disc in a young female suggests a diagnosis of MS with a retrobulbar neuritis.

7- A woman gives birth to a male child who is found to have bilateral cataracts. Which of the following diagnoses should be considered?

- 1) Galactosaemia [0]
- 2) Hypoparathyroidism [0]
- 3) Hypocalcaemia [0]
- 4) Lowe's Syndrome [100]
- 5) Wilson's Disease [0]

A cataract is any opacity of the lens. Many signify ocular or systemic disease. They may also occur secondary to intraocular processes such as retinopathy of prematurity, persistent hyperplastic primary vitreous, retinal detachment, retinitis pigmentosa, and uveitis.

Causes include:

Developmental: prematurity, mendelian, AR, X-linked (Lowe's, Alport's, Fabry Disease).

Congenital infection.

Chromosomal: trisomy 13, 18, 21, Turner's.

Metabolic: galactosaemia, juvenile onset diabetes, infant of diabetic mother, hypoparathyroidism, hypocalcaemia, occulocerebrorenal syndrome of Lowe, Wilson's Disease, sphingolipidoses, mucopolysaccharidoses, mucopolipidoses.

Drugs: steroids, trauma.

The majority of metabolic diseases have progressive deterioration in cataract, while at birth the commonest causes will be congenital infection, infant of diabetic mother, or Lowe's Syndrome.

8- Regarding retinoblastoma which of the following statements is correct?

- 1) Bilateral involvement is found in 70% of cases. [0]
- 2) The predisposition may be inherited as an autosomal dominant condition. [0]
- 3) There is an increased risk of autoimmune disease. [0]
- 4) They have often metastasised by the time of diagnosis. [0]
- 5) They usually present with leukocoria. [100]

The incidence is 1 in 16,000 live births. Genetic predisposition occurs in 20% of patients with unilateral disease, and 30% of patients with bilateral disease. The gene has been localised to 13q and the inherited form is associated with an increased risk of malignancy such as osteosarcoma and pineal tumours. The commonest presentation is leukocoria (yellowish white pupil reflex), and there may be diminished or absent vision or strabismus. Late symptoms are pupil irregularity, hyphema, pain, proptosis, and signs of raised intracranial pressure. The tumours have rarely metastasised before they are detected.

9- Which of the following conditions is associated with a pathognomonic retinal change.

- 1) Infective endocarditis [0]
- 2) Polycythaemia Rubra Vera [0]
- 3) Toxoplasmosis [0]
- 4) Wilson's disease [0]
- 5) Sickle cell anaemia [100]

SCD is associated with the 'Black sunburst' - a chorioretinal scar, which is one of the commoner retinal manifestation of SCD and pathognomonic. Roth spots, seen in infective endocarditis are also seen in leukaemia. Choroidoretinitis in toxoplasmosis may also be seen with other disorders. The KL rings of Wilson's disease are found on the iris.

10- A 25 year-old man presents with 24 hours blurred vision in left eye and mild frontal headache. He has a 10 year history of Diabetes Mellitus. Examination reveals a central scotoma. What is the diagnosis?

- 1) Central retinal artery occlusion. [0]
- 2) Diabetic retinopathy. [0]
- 3) Optic neuritis. [100]
- 4) Pituitary tumour. [0]
- 5) Migraine. [0]

Optic neuritis typically presents with unilateral painful visual impairment in young people. Central scotoma is the typical visual defect of optic neuritis. Diabetic neuropathy, migraine and central retinal artery occlusion do not cause central scotoma.

11- Which of the following is NOT associated with retinitis pigmentosa:

- 1) Abetalipoproteinaemia [0]
- 2) Friedreich's ataxia [100]
- 3) Hurler's syndrome [0]
- 4) Lawrence-Moon-Biedl syndrome [0]
- 5) Refsum's disease [0]

Other causes of pigmentary retinopathy include Usher's syndrome and mitochondrial myopathy. Abetalipoproteinaemia is autosomal recessive and is associated with hypocholesterolaemia, syndrome resembling Friedreich's ataxia, abnormally shaped RBC (acanthocytes), steatorrhoea and fatty liver.

12- Which of the following concerning Diabetic retinopathy is correct?

- 1) Is unusual in type 2 diabetic patients [0]
 - 2) Improved glycaemic control is more effective than hypertensive control in reducing progression of disease. [0]
 - 3) Normal visual acuity is seen in Proliferative retinopathy. [100]
 - 4) Progression may be reduced statin therapy [0]
 - 5) Soft exudates are a feature of background retinopathy. [0]
-

Diabetic retinopathy occurs in both type 1 and 2 DM and may be a presenting feature in Type 2 as the condition may have existed for many years prior to diagnosis. Progression may be slowed with improved glycaemic and hypertensive control but the latter has been shown to be more effective at reducing progression (UKPDS). There are no data at present to suggest that Statin therapy reduces disease progression. Soft exudates are a feature of pre-proliferative Rn and despite quite marked new vessel disease the visual acuity may be normal.

13- A 50 year old man with a history of Diabetes Mellitus and hypertension attends an ophthalmic clinic for regular assessment. On fundoscopy he is diagnosed to have preproliferative diabetic retinopathy. Which of the following is characteristic of preproliferative diabetic retinopathy?

- 1) Cotton Wool Spots [0]
- 2) Microaneurysms [0]
- 3) Hard Exudates [0]
- 4) Venous Beading [100]
- 5) Macular Odema [0]

B,C and E suggests background diabetic retinopathy. A suggests either diabetic or hypertensive retinopathy. D is characteristic for preproliferative diabetic retinopathy.

Paediatrics

1- Left axis deviation is seen on the ECG in which of the following conditions?

- 1) atrioventricular canal defects. [100]
- 2) Ebstein's anomaly. [0]
- 3) large ventricular septal defect. [0]
- 4) patent ductus arteriosus. [0]
- 5) tetralogy of Fallot. [0]

Left axis deviation is also seen in tricuspid atresia.

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<http://www.ecglibrary.com/axis.html>

causes of a Northwest axis (no man's land)

emphysema
hyperkalaemia
lead transposition
artificial cardiac pacing
ventricular tachycardia

causes of right axis deviation

normal finding in children and tall thin adults
right ventricular hypertrophy
chronic lung disease even without pulmonary hypertension

anterolateral myocardial infarction
left posterior hemiblock
pulmonary embolus
Wolff-Parkinson-White syndrome - left sided accessory pathway
atrial septal defect
ventricular septal defect

causes of left axis deviation

left anterior hemiblock
Q waves of inferior myocardial infarction
artificial cardiac pacing
emphysema
hyperkalaemia
Wolff-Parkinson-White syndrome - right sided accessory pathway
tricuspid atresia
ostium primum ASD
injection of contrast into left coronary artery
note: left ventricular hypertrophy is not a cause left axis deviation

2- Regarding retinoblastoma which of the following statements is correct?

- 1) Bilateral involvement is found in 70% of cases. [0]
- 2) The predisposition may be inherited as an autosomal dominant condition. [0]
- 3) There is an increased risk of autoimmune disease. [0]
- 4) They have often metastasised by the time of diagnosis. [0]
- 5) They usually present with leukocoria. [100]

The incidence is 1 in 16,000 live births. Genetic predisposition occurs in 20% of patients with unilateral disease, and 30% of patients with bilateral disease. The gene has been localised to 13q and the inherited form is associated with an increased risk of malignancy such as osteosarcoma and pineal tumours. The commonest presentation is leukocoria (yellowish white pupil reflex), and there may be diminished or absent vision or strabismus. Late symptoms are pupil irregularity, hyphema, pain, proptosis, and signs of raised intracranial pressure. The tumours have rarely metastasised before they are detected.

3- Which ONE of the following is associated with Marfan's syndrome?

- 1) Autosomal recessive inheritance [0]
- 2) increased upper : lower body ratio [0]
- 3) Mental retardation [0]
- 4) Pulmonary stenosis [0]
- 5) Retinal detachment [100]

Marfan's syndrome is an autosomal dominant condition associated with ocular abnormalities such as upwards lens dislocation and retinal detachment. Aortic regurgitation may be a finding and aneurysmal dilatation is a feature. Upper to lower body ratio (head to symphysis pubis : Symphysis pubis to toes) is decreased in Marfan Syndrome. <http://www.onexamination.com/site/Paedia.asp?id=598>

4- Which of the following statements regarding systemic lupus erythematosus (SLE) is correct?

- 1) when disease is active the levels of complements C3 and C4 are raised. [0]
- 2) when evidence of mild nephritis is present, a renal biopsy is unnecessary. [0]
- 3) there is a female preponderance of 8:1. [0]
- 4) first manifestation of the disease may be idiopathic thrombocytopenia purpura. [100]
- 5) there is neurological involvement in about 10% of cases. [0]

When SLE is active the serum complement is depressed. C3 and C4 levels can be used to monitor response to treatment. A poor correlation exists between the clinical manifestations and severity of renal involvement. A biopsy is essential in guiding treatment when renal involvement exists. Neurological involvement is common in SLE. Nearly 50% have neurological problems including: personality disorder, seizures, cardiovascular accidents, and a peripheral neuritis (mononeuritis multiplex). From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 57 © WB Saunders. Reproduced with permission.

5- Which of the following are true of chronic renal failure in childhood?

- 1) is unlikely to be due to chronic pyelonephritis unless there is a clear history of an acute attack [0]
- 2) if accompanied by renal osteodystrophy is likely to be associated with severe hypertension [0]
- 3) is an unusual sequel of acute post-streptococcal glomerulo-nephritis [100]
- 4) is the most common sequel to the nephrotic syndrome [0]
- 5) is likely to be benefited by administration of corticosteroids [0]

CRF may occur in childhood as a consequence of inherited disorders such as Alport's from recurrent infection and reflux disease. Renal function usually resolves post-strep GN.

6- Which of the following public health measures would reduce the incidence of iron deficiency anaemia?

- 1) Using doorstep cow's milk from 6 months of age. [0]
- 2) Giving young children tea rather than fruit juice. [0]
- 3) Delaying the introduction of mixed feeding until 9 months of age. [0]
- 4) Giving 0.5mg per day of elemental iron to all preterm babies. [0]
- 5) Continuing breast feeding until a year of age. [100]

The following would achieve primary prevention of iron deficiency anaemia:

Provision of adequate iron supplements for premature and low birth weight infants in adequate dosage (2mg/kg of elemental iron per day).

Not using unmodified doorstep milk in the first year of life. Although breast milk has a low iron concentration, the relative bioavailability is much higher than from modified or unmodified cow's milk.

Not giving young children tea (this reduced iron's bioavailability).

Use of follow-on or ordinary infant formulae in the second half of the first year of life.

Weaning on to mixed feeding by 6 months of age.

Iron supplementation for all children in high risk groups.

7- Which of the following statements regarding messenger RNA (mRNA) is correct?

- 1) mRNA never contains introns. [0]
- 2) mRNA is translated into proteins in the nucleus. [0]
- 3) mRNA contains the bases cytosine and thymine. [0]
- 4) reverse transcriptase uses mRNA as a template to produce complementary DNA. [100]
- 5) mRNA is used in the Southern blotting technique. [0]

The structure of mRNA is similar to DNA except that uracil replaces thymine as one of the bases. Both coding (exons) and non-coding regions of DNA are initially transcribed into mRNA. Splicing is required for mature mRNA to be produced only consisting of introns. Translation occurs in the cytoplasm. Southern blotting is a technique that uses denatured fragments of DNA in a gel to bind to DNA probes in order to detect the presence of particular genes or sequences of DNA. The enzyme reverse transcriptase can be used by viruses to insert viral mRNA into the host genome. From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 121 © WB Saunders. Reproduced with permission.

8- Which of the following is a recognised treatment for complications of cystic fibrosis?

- 1) DNAase to assist in reinflating collapsed lung segments. [0]
- 2) Rectal pull-through and anastomosis for rectal prolapse. [0]
- 3) Pancreatic transplant for diabetes mellitus. [0]
- 4) Nebulised tobramycin for pseudomonas colonisation of the lower respiratory tract. [100]
- 5) Hypotonic saline drinks for hypernatraemic dehydration. [0]

Human recombinant DNAase given as a single daily aerosol seems to improve pulmonary function, decrease the frequency of chest exacerbations, and promotes a sense of well-being in patients with mild to moderate disease with purulent secretions. This may be because, in the inflamed airway, the nuclei from dead cells accounts for much of the viscosity of secretions. Rectal prolapse is usually idiopathic, occurring between 1 and 5 years. Intestinal parasites, malnutrition, acute diarrhoea, ulcerative colitis, pertussis, Ehler's Danlos Syndrome, meningocele, cystic fibrosis, and chronic constipation can also predispose to it. Following defecation the prolapse usually resolves spontaneously, or through manual reinsertion by the patient or parent. Nebulised tobramycin or gentamicin may be given when airway pathogens are resistant to oral antibiotics, or where infection is difficult to control at home. Hypernatraemic dehydration should be treated in the usual way.

9- What is the most likely outcome of minimal change nephropathy at 16 year of age?

- 1) a tendency to relapse [0]
- 2) full renal recovery [100]

- 3) permanent renal impairment [0]
- 4) persistent hypertension [0]
- 5) persistent proteinuria [0]

30-40% of children achieve spontaneous remission and 90% achieve remission following 8 weeks treatment with high dose steroids. However in adults only around 50% achieve remission.

10- Which of the following may cause a downbeat nystagmus?

- 1) Chiari type I malformation [100]
- 2) Unilateral medial longitudinal fasciculus lesion [0]
- 3) Central cerebellar lesion [0]
- 4) Wernicke's encephalopathy [0]
- 5) Aqueduct stenosis [0]

Nystagmus is defined as involuntary oscillations of the eyes. This may be pendular when the oscillations are equal in rate and amplitude; jerking - when there are quick and slow phases (the quicker phase is used to define the direction. Nystagmus may be caused by visual disturbances, lesions of the labyrinth or the central vestibular connections, or by brain stem or cerebellar lesions. Pendular nystagmus is usually due to loss of macular vision, but may be seen in diffuse brain stem lesions. Jerking nystagmus, which is of constant direction regardless of the direction of gaze, suggests a labyrinthine or cerebellar lesion. Nystagmus which changes with the direction of gaze suggests a widespread central involvement of vestibular nuclei. Jerking nystagmus present only on lateral gaze, and whose fast component is in the direction of gaze, indicates a lesion of the brain stem or cerebellum. Nystagmus confined to one eye suggests a peripheral lesion of the nerve or muscle, or a lesion of the medial longitudinal bundle. Nystagmus restricted to the abducting eye on lateral gaze (ataxic nystagmus) is due to a lesion of the medial longitudinal bundle between the pons and mid-brain as in MS. Nystagmus occurring on upward gaze with the fast component upwards (upbeat nystagmus) may be due to a lesion in the mid-brain at the level of the superior colliculus. Downbeat nystagmus (fast phase downwards) suggests a lesion in the lower part of the medulla. It is therefore, typical of the Arnold Chiari malformation.

11- Which of the following conditions may be detectable by growth monitoring?

- 1) Hyperthyroidism [0]
- 2) Hypothyroidism [100]
- 3) Pseudohypoparathyroidism [0]
- 4) XYY Syndrome [0]
- 5) Insulin dependent diabetes mellitus [0]

Benefits of growth monitoring include:

Early detection of conditions such as:

hypothyroidism.

growth hormone insufficiency.

syndromes: Turners, Russell-Silver, Noonan's, skeletal dysplasias.

growth impairment e.g. coeliac disease, inflammatory bowel disease or chronic renal failure.

intracranial tumours.

short normal children.

children with short stature.

Health promotion: impaired growth may be associated with child abuse or neglect for example.

Focus of interest for parents.

Public health aspects:

secular trend of increasing growth.

linking growth patterns in fetal life and early infancy with adult patterns of disease.

link between height and social circumstances.

12- A complete unilateral facial hemiparesis may be caused by which of the following?

- 1) An intracranial tumour [0]
- 2) Birth injury [100]
- 3) Cerebellar atrophy [0]
- 4) Myasthenia gravis [0]
- 5) Phenothiazine toxicity [0]

The facial nerve consists of 2 parts. The larger motor components supplies all the muscles of facial expression, while the smaller part (nervous intermedius) comprises the sensory and parasympathetic branches of taste from the anterior two thirds of the tongue, with efferent fibres to the lacrimal, submaxillary, and sublingual salivary glands. Unilateral upper motor neurone lesions (above the level of the pons) cause weakness more in the lower than in the upper part of the face, since upper facial structures receive bilateral innervation. A unilateral lower motor neurone lesion such as Bell's Palsy, affects the eyes as well. An intracranial tumour can, therefore, cause complete weakness only when both sides are affected. A forceps injury may compress the facial nerve.

13- Which of the following is true of Koplik's spots?

- 1) Are diagnostic of Measles [100]
- 2) Located opposite the incisor teeth. [0]
- 3) Only appear when fever is over 39°C [0]
- 4) They appear as red papules on the palmar surface of the hands [0]
- 5) Typically appear two days after the rash. [0]

Koplik's spots are small, irregular, bright red spots with blue-white centres, occurring on the inside of the cheek next to the premolars. Seen only in measles they are diagnostic. The spots usually occur briefly after the fever begins and a couple of days before the generalized rash appears. Not infrequently, the spots disappear as the eruption develops.

14- Which of the following statements is true regarding smoking in pregnancy?

- 1) Smoking assists in maturation of the fetal lung. [0]
- 2) The reduction in birth weight is related to the number of cigarettes smoked per day. [100]
- 3) Maternal smoking may adversely affect testicular function in male children. [0]
- 4) Dysmorphic facies is a recognised complication. [0]
- 5) The newborn baby may require adjustments in drug dosages because of it. [0]

Smoking reduces birth weight which may be of critical importance if the baby is born pre-term. On average, the babies of smokers weigh 170g less than non-smokers, but the reduction in birth weight is related to the number of cigarettes smoked per day. Smoking is also associated with an increased risk of miscarriage and still birth. The infant has a greater risk of Sudden Infant Death Syndrome. There is some evidence that maternal smoking may adversely affect ovarian function in female children. No dysmorphic syndrome has yet been described.

Palliative Care

1- A 64-year-old man has terminal cancer with hepatic metastases. He is treated with oral morphine (Oramorph) solution for pain relief.

Which is the most important pharmacodynamic factor in determining the appropriate timing between doses?

- 1) bioavailability [0]
- 2) first pass metabolism [100]
- 3) gastric emptying [0]
- 4) plasma half-life [0]
- 5) renal clearance [0]

Morphine undergoes extensive first pass metabolism in the liver. And it has got effect on bioavailability and plasma half-life. Oral morphine is well absorbed.

2- Which of the following concerning diamorphine elixir for the relief of pain in terminal patients is correct?

- 1) Analgesia is enhanced if cocaine is added [0]
- 2) Constipation is a characteristic sequel to treatment [100]
- 3) Dependence occurs rapidly [0]
- 4) initial sedation typically continues whilst the drug is administered [0]
- 5) the same amount of pain relief is produced as when the same dose is given via intramuscular injection [0]

Sedation occurring in the first few days typically wears off, leaving the patient alert. Hallucinations also tend to occur. An aperient should always be added to the treatment regime. Addiction is not a problem. An intramuscular injection is three times more effective than the same oral dose (Cornwall Trainers)

3- A 68-year-old man has been very ill for months following the onset of chronic liver disease with hepatitis C infection. He experiences a sudden loss of consciousness and

then exhibits paraplegia on the right. A cerebral angiogram reveals lack of perfusion in the left middle cerebral artery distribution. The most likely cardiac lesion to be associated with this finding is?

- 1) Acute rheumatic fever [0]
- 2) Left atrial myxoma [0]
- 3) Libman-Sacks endocarditis [0]
- 4) Non-bacterial thrombotic endocarditis [100]
- 5) Paradoxical thromboembolus [0]

Marantic endocarditis has platelet-fibrin thrombi that are prone to embolize. This form of non-infective endocarditis can be seen in persons who are very debilitated or who have a hypercoagulable state.

Pharmacology

1- Which of the following statements concerning the treatment of acute myocardial infarction is correct?

- 1) A pansystolic murmur developing within the first 24 hours does not require further investigation. ☐
- 2) Dipyridamole therapy reduces reinfarction within the first year. ☐
- 3) Heparin is beneficial if given with streptokinase. ☐
- 4) Prophylactic lignocaine given in the first 48 hours is effective in preventing ventricular fibrillation ☐
- 5) Treatment with a dihydropyridine calcium antagonist is associated with increased cardiovascular mortality. ☐

GISSI II revealed no survival advantage of heparin plus streptokinase in acute MI compared with strep alone. ISIS II revealed that dihydropyridine calcium antagonists were associated with increased cardiovascular risk after MI. Dipyridamole does not reduce risk. A newly discovered pansystolic murmur may signify acquired MR or VSD.

2- A 30 year old male presented with a paranoid psychosis accompanied by visual hallucinations which resolved over the next three days. Which one of the following is the most likely diagnosis?

- 1) Alcohol withdrawal. ☐
- 2) Diazepam dependence. ☐
- 3) Fluoxetine overdose. ☐
- 4) Heroin withdrawal. ☐
- 5) Smoking cannabis. ☐

The paranoid psychosis with visual hallucinations is highly suggestive of delirium tremens – alcohol withdrawal.

3- Which ONE of the following concerning Insulin is correct?

- 1) acts via a similar mechanism as steroid receptors ☐
- 2) causes an increased glucose-protein transport on the endoplasmic reticulum ☐

- 3) can be detected in the lymph ☐
- 4) interacts with the nuclear membrane ☐
- 5) is synthesised in the alpha cells of islets of Langerhans ☐

 a-Cell surface receptors.

Insulin binding to its receptor results in receptor autophosphorylation on tyrosine residues and the tyrosine phosphorylation of insulin receptor substrates (IRS-1, IRS-2 and IRS-3) by the insulin receptor tyrosine kinase. (Read more from the Journal of Cell Science.)p>

http://www.biochem.wisc.edu/biochem630/readings/21*Insulin_signaling.pdf
 e-Beta.

4- In which of the following circumstances would the treatment of anaemia with erythropoietin still be expected to be effective?

- 1) Aluminium toxicity ☐
- 2) Folate deficiency ☐
- 3) Hyperkalaemia ☐
- 4) Infection ☐
- 5) Iron deficiency ☐

 Epoetin (recombinant human erythropoietin) is used in chronic renal failure, to shorten the period of anaemia in those receiving platinum-based chemotherapy and prevention of anaemia in premature babies with low birth weight.

5- A 70-year-old male is referred by his GP for management of recently diagnosed congestive heart failure. The patient has a history of poorly controlled hypertension. Over the last three months he has been aware of deteriorating shortness of breath, fatigue, and orthopnea. Over the last month he had been commenced on Digoxin (62.5 micrograms daily), Frusemide (80 mg daily), and amiloride 10 mg.

On examination he has a pulse of 96 bpm regular, a blood pressure of 132/88 mmHg. His JVP was not raised, he had some scattered bibasal crackles on auscultation with a displaced apex beat in the anterior axillary line, 6th intercostal space. Auscultation of the heart revealed no murmurs and he had peripheral oedema to the mid tibia.

Investigations showed: electrolytes normal
 serum urea concentration 17 mmol/l (NR 2-8 mmol/l)
 creatinine 175 micromol/l (NR 55-110)
 Serum digoxin 0.7 ng/mL {therapeutic: 1.0-2.0}

One month previously his urea had been 11 mmol/l and creatinine 110 micromol/l. An ECG reveals left ventricular hypertrophy and Chest X-ray shows cardiomegaly and calcified aorta.

What is the most appropriate next step in management?

- 1) Add an ACE inhibitor to the current regimen ☐
- 2) Add atenolol at a dose of 25mg daily ☐
- 3) Increase digoxin to 0.25 mg daily ☐

- 4) Increase frusemide to 80 mg twice daily ☐
- 5) Maintain on current therapy. ☐

This patient would be classified as probably NYHA grade III heart failure (dyspnoeic at rest). With the persisting symptoms despite 80mg of frusemide, guidelines would initially suggest the addition of an ACE inhibitor. Although there has been a mild decline in his U+Es since the introduction of therapy this would not be a contra-indication to the use of ACEis. There is no evidence that increasing a dose of digoxin above 62.5 micrograms in a patient in sinus rhythm would have any added benefit. Although beta-blockers would be of further benefit in this patient, it is important first to establish him on ACEi and then introduce beta-blockers like carvedilol, metoprolol or bisoprolol in a small dose and gradually increase.

6- Which one of the following drugs works by inhibiting the tumour necrosis factor?

- 1) cyclosporin ☐
- 2) infliximab ☐
- 3) methotrexate ☐
- 4) montelukast ☐
- 5) sulphasalazine ☐

Montelukast works as leukotriene receptor antagonists, and is used in treatment of asthma. Etanercept and infliximab inhibit TNF and are licensed in the treatment of rheumatoid arthritis. Infliximab is given with methotrexate and is associated with development of tuberculosis.

7- Which of the following is NOT associated with hyponatraemia and hyperkalaemia?

- 1) Acute hypoadrenalism ☐
- 2) Carbenoxolone therapy ☐
- 3) Co-Amilorfruse therapy ☐
- 4) Congestive cardiac failure. ☐
- 5) Type IV renal tubular acidosis ☐

Carbenoxolone therapy may be associated with hypokalaemia and salt retention due to pseudohypoaldosteronism through inhibition of the enzyme 11 beta Hydroxysteroid dehydrogenase. Type IV renal tubular acidosis is associated with hyporeninaemic hypoaldosteronism and both hyponatraemia and hyperkalaemia can occur. Hypoadrenalism is associated with hyperkalaemia and hyponatraemia as is Cardiac failure, hepatic and renal failure. Co-amilorfruse the combination of amiloride and frusemide may also produce this biochemical picture.

8- A 70 year old male was receiving amiodarone 200 mg daily for intermittent atrial fibrillation. However, he was aware of tiredness and lethargy. He appeared clinically euthyroid with no palpable goitre. Investigations revealed:

Serum free T4 23pmol/L (9-26)
Serum total T3 0.8 nmol/L (0.9-2.8)
Serum TSH 8.2 mU/L (<5)

Which of the following statements would explain these results?

- 1) Abnormal thyroxine binding globulin ☐
- 2) Amiodarone-induced hypothyroidism ☐
- 3) 'sick euthyroid' syndrome ☐
- 4) Spontaneous hypothyroidism ☐
- 5) TSH secreting pituitary adenoma ☐

The results show normal T4, low T3 with elevated TSH. These results are typical of amiodarone induced hypothyroidism which inhibits the peripheral conversion of T4 to T3.

9- There is presently no known effective treatment for a chronic disease. A new treatment is known to be effective in animal models and shows promise in short-term studies in patients. There is some theoretical concerns regarding possible hepato- and bone marrow toxicity although thus far, no toxicity have been observed in studies.

What is the most appropriate next step in the drug's development?

- 1) A case control study ☐
- 2) No further studies should be done and drug development should be stopped ☐
- 3) An open study ☐
- 4) A randomised double blind placebo controlled study ☐
- 5) A randomised single blind placebo controlled study ☐

A case control study is efficient (high yield of information from relatively few subjects) and provides an estimate of strength of association (odds ratio) between the use of drug and development of side-effects for liver and bone marrow. This may form the Phase 1 and 2 trials involving relatively few subjects to establish therapeutic efficacy and acceptable safety before large scale clinical trials involving placebo controlled trials (phase 3) are carried out to confirm therapeutic efficacy and acceptable safety.

10- A 51-year-old female is referred by her GP over concerns about osteoporosis. She had a hysterectomy and oophorectomy because of uterine fibroids one year ago, after which she developed hot flushes that now have stopped. Her elderly mother recently fractured the neck of her femur and the patient is worried about the possibility that she too will fracture her hip later in life.

She is otherwise well, is a non-smoker drinks about 5 units of alcohol weekly and has a healthy diet.

Examination reveals a fit thin female with a BMI of 18, her blood pressure is 122/88mmHg and breast examination is normal.

Which of the following would you recommend for her?

- 1) Bisphosphonates ☐
- 2) Calcitonin ☐
- 3) Combined Oestrogen and progesterone therapy ☐

- 4) Unopposed Oestrogen therapy ☐
- 5) Vitamin D ☐

This patient has a risk for osteoporosis being thin and recently having had Oophrectomy. Department of Health guidelines would support the use of Oestrogen replacement as first-line therapy in such patients. Unopposed oestrogen therapy is most appropriate as the patient has had a hysterectomy and combined HRT is unnecessary. Tibolone, Raloxifene and Bisphosphonates are recommended as second line agents where HRT may be poorly tolerated or contra-indicated.

<http://www.doh.gov.uk/osteop.htm>

11- Which of the following may be responsible for an acute relapse of Systemic Lupus Erythematosus in a 38 year old female?

- 1) hydralazine therapy ☐
- 2) Pregnancy ☐
- 3) Progesterone only contraceptive pill ☐
- 4) Salmeterol therapy ☐
- 5) Winter holiday in Lapland ☐

Some physiological and environmental factors affect the periods of deterioration and of remission in systemic lupus erythematosus. These factors include HRT and particularly the oral contraceptive, pregnancy and infection. It would not be expected with the progesterone only oral contraceptive. You would expect to find virtually no sun on a winter holiday in Lapland (Arctic Circle)! A number of drugs (hydralazine, procainamide, isoniazid, chlorpromazine, D-penicillamine and methyldopa) can result in drug-induced lupus in predisposed individuals. This can be differentiated from the idiopathic SLE on genetic and immunologic grounds. Furthermore, it is mild and reversible on stopping the drug, renal disease and double stranded anti-DNA are rare (although antibodies specific for histones may be present) and the sex ratio is equal. They do not cause deterioration in patients with SLE.

12- Which of the following drugs is most likely to cause systemic lupus-like syndrome?

- 1) baclofen ☐
- 2) isoniazid ☐
- 3) methotrexate ☐
- 4) procainamide ☐
- 5) sulphasalazine ☐

A recessive gene is responsible for activity of hepatic N-acetyl transferase resulting in slow or fast (intermediate and fast groups get lumped together). 45% UK population are slow acetylators. Drugs affected include isoniazid, hydralazine, dapsone, procainamide and sulphasalazine. Slow acetylators have increased risk of isoniazid-induced peripheral neuropathy, and hydralazine or procainamide-induced SLE. Fast acetylators are at more risk of isoniazid-induced hepatitis.

13- Which of the following reactions is involved in the metabolism of paracetamol under normal conditions?

- 1) cytochrome p450 dependent oxidation ☐
- 2) hydrolysis ☐
- 3) conjugation to glucuronic acid ☐
- 4) conjugation to glutathione ☐
- 5) acetylation ☐

Paracetamol is conjugated to glucuronic acid and sulphate under normal conditions. In overdose these processes become saturated and the drug is then conjugated with glutathione. If the glutathione supply is depleted then a toxic metabolite is formed.

14- An 85 year old woman presented with bilateral osteoarthritis of the knees. She had no history of previous gastrointestinal disease. Which of the following is the most appropriate initial treatment for her?

- 1) Celecoxib ☐
- 2) Naproxen ☐
- 3) Dihydrocodeine ☐
- 4) Paracetamol ☐
- 5) Topical diclofenac. ☐

The recommendations of the American College of Rheumatology published in Arthritis and Rheumatism 2000, recommend acetaminophen (paracetamol) together with non-pharmacological interventions (exercise, diet) as first line therapy of mild/moderate OA of hips or knees.

15- A 24 year old man presented twelve hours after an overdose of dihydrocodeine 1.2 g and paracetamol 30 g. He had pinpoint pupils, a Glasgow Coma Scale score of 14 and a blood pressure of 100/60 mmHg. Which one of the following is the most appropriate management?

- 1) 500ml of 10% glucose intravenously over four hours. ☐
- 2) Intravenous Flumazenil. ☐
- 3) Intravenous Naloxone. ☐
- 4) Intravenous N-acetylcysteine. ☐
- 5) Oral activated charcoal. ☐

This patient's GCS is reasonable and the opiate-like effects seem minimal (no evidence of respiratory depression). However, this patient has received a hefty dose of paracetamol conferring a high risk of hepatic toxicity. The 12 hour delay makes the absorptive effects of charcoal limited and although it would be useful as gastric emptying may be delayed it is not as important in this patient as the paracetamol antidote. Even though the paracetamol level is not provided, he should be treated with N-acetylcysteine without delay.

16- A youth worker, aged 40, presents to Accident and Emergency with vomiting. On detailed questioning, he admits to having taken 36 paracetamol tablets 2 hours

previously. He is vomiting profusely with a BP of 90/60. Which of the following measures would be most appropriate?

- 1) Paracetamol levels ☐
- 2) oral methionine ☐
- 3) IV N-acetyl cysteine ☐
- 4) IV fluids ☐
- 5) Coagulation screen ☐

The most pressing issue in this patient is resuscitation as he is vomiting and hypotensive. It is too early to carry out paracetamol levels as these should be carried out at 4 hours, and certainly too early to instigate treatment with NAC or methionine. An INR gives an indication of hepatocellular damage and again this will not be seen at presentation of paracetamol overdose.

17- An 18-year-old woman is admitted after taking drugs at a night-club. Which of the following features suggest she had taken Ecstasy (MDMA)?

- 1) A pyrexia of 40°C ☐
- 2) hypernatraemia ☐
- 3) hypokalaemia ☐
- 4) metabolic acidosis ☐
- 5) respiratory depression ☐

Hyponatraemia, tachycardia, hyperventilation and hyperthermia are features of the amphetamine MDMA abuse.

18- A 67 year old man presents with sudden onset atrial fibrillation (ventricular rate of 150/minute). His serum creatinine concentration was 250 µmol/L (70-110).

What is the main factor that determines the choice of loading dose of digoxin in this patient?

- 1) Absorption ☐
- 2) Apparent volume of distribution ☐
- 3) Lipid solubility ☐
- 4) Plasma half-life ☐
- 5) Renal clearance ☐

The pharmacokinetics of digoxin are complex and best explained by a two compartment model. The loading dose is mainly dependent on the Volume of Distribution of a drug but this patient has moderate renal failure. The loading dose is calculated (using various models) by taking into account age, creatinine clearance, body surface area etc. Volume of distribution becomes important particularly when body weight is 40kg or less. On balance it is the renal failure that is the most important factor in this patient in determining the loading dose.

Digoxin is cleared by the kidneys so the maintenance dose would require adjustment in renal failure.

19- A 30-year-old man presents with a history of transient loss of consciousness and palpitations. His ECG shows ventricular tachycardia.

Which of the following treatments should be avoided?

- 1) adenosine ☐
- 2) amiodarone ☐
- 3) DC cardioversion ☐
- 4) flecainide ☐
- 5) verapamil ☐

If there were 'killer' questions (questions that if a candidate got wrong they would certainly fail the exam) in the MRCP exam then this would be one of them. Verapamil should be avoided in cases of VT because it can cause a catastrophic fall in blood pressure. Adenosine is useful diagnostically when the diagnosis of regular wide complex tachycardia is in doubt. Amiodarone is a useful antiarrhythmic agent though its use acutely is limited by its irritant nature on veins. DC Cardioversion is probably the treatment of choice in this case. Flecainide is a good antiarrhythmic and would be indicated in patients without LV failure (it is associated with an increased risk of death in such cases). Flecainide is widely used for atrial fibrillation.

20- A 58-year-old man has a history of obesity, gastro-oesophageal reflux disease, low back pain and IHD. He presents with large, itchy wheals over the trunk and limbs and a sensation of tightness in the throat. Which one of the following drugs is the most likely to have triggered this skin eruption?

- 1) aspirin ☐
- 2) GTN (nitrate) spray ☐
- 3) omeprazole ☐
- 4) paracetamol ☐
- 5) simvastatin ☐

In hypersensitive patients aspirin can cause angioedema, bronchospasm and urticaria(skin rashes).

21- A 43 year old woman with atopic dermatitis (atopic eczema) presented with an acute generalized exacerbation of her disease. She was admitted to hospital but failed to improve with emollients, topical betamethasone-17-valerate and oral antihistamine. Which one of the following drugs is the most appropriate treatment?

- 1) Acitretin ☐
- 2) Amoxycillin ☐
- 3) Ciclosporin ☐
- 4) Colchicine ☐
- 5) Dapsone ☐

Cyclosporin is a well used drug in the treatment of atopic dermatitis. It is usually at doses of 2-5 mg/kg. The pathophysiology of AD is complex but the T lymphocytes are involved and it is known that there is an increased production of cytokines particularly IL-4. Ciclosporin is a suppressor of T cells and in that respect works very

well in atopic dermatitis and psoriasis. The side effects of hypertension and renal toxicity limit its use. These patients are seen monthly to have their BP and U+Es checked.

PSORIASIS:

REFERENCES: 1) New Ethicals, May 1996, Vol 33, No5, pg 57

22- A 30-year-old man presents to the Accident and Emergency Department with a history of drug overdose. He is known to be repeatedly admitted with similar episodes of self-harm. On this occasion he is drowsy and has prominent hypersalivation.

Which of the following agents, found on his person, is the likely cause?

- 1) Chlormethiazole ☐
- 2) Cocaine ☐
- 3) Dothiepin ☐
- 4) L-dopa ☐
- 5) Solvent cannister ☐

Hypersalivation is seen with parasympathomimetic agents, insecticides, arsenic, strychnine, chlormethiazole and clozapine and others. Solvent abuse may cause an acneiform rash around the buccal cavity. Cocaine abuse leads to hypertension and nasal septum perforation. The other agents are anticholinergic and would cause dry mouth in overdose.

23- Which of the following is a contraindication to immunisation?

- 1) Infantile eczema requiring topical steroids. ☐
- 2) Oral poliomyelitis vaccine to a child on oral steroids. ☐
- 3) A history of prolonged jaundice. ☐
- 4) A child with congenital adrenal hyperplasia on oral cortisone. ☐
- 5) A child with cerebral palsy. ☐

Common misconceptions regarding immunisations include:

A family history of adverse reaction, or a previous history of pertussis, measles, rubella or mumps infection.

Prematurity or low birth weight.

Stable neurological conditions such as cerebral palsy or Down's Syndrome.

Asthma, eczema, hayfever or snuffles.

Contact with an infectious disease, or treatment with antibiotics or topical steroids.

Pregnant mother or a mother who is breast feeding.

Prolonged jaundice.

Patients on replacement corticosteroids.

Oral polio vaccine should not be given to immunosuppressed children, their siblings or household contacts. In children with HIV, there is little evidence that they themselves will have problems, but excretion may be prolonged, and this may give rise to an increased risk of infection of HIV positive household contacts.

24- In which of the following cases would the level of the second drug (or its effect) become elevated by adding the first?

- 1) Erythromycin : theophylline ☐
- 2) Phenytoin : ethynoloestrodial ☐
- 3) Ranitidine : corticosteroid ☐
- 4) Rifampicin : warfarin ☐
- 5) Valproate : phenobarbitone ☐

Erythromycin inhibits the metabolism of theophylline, elevating the plasma theophylline concentration. Phenytoin accelerates the metabolism of oral contraceptives, reducing the contraceptive effect. Rifampicin accelerates the metabolism of warfarin, reducing the anticoagulant effect. Concomitant administration of 2 or more antiepileptics may enhance toxicity without a corresponding increase in antiepileptic effect. Interactions between individual antiepileptics can complicate monitoring of treatment, and interactions include enhanced effect, increased sedation and reductions in plasma concentration. Ranitidine has very few interactions with other drugs. Cimetidine is a liver inducer.

25- Which of the following is true concerning oral hypoglycaemic agents?

- 1) Acarbose promotes insulin secretion in response to meals ☐
- 2) Chlorpropamide induces liver enzymes ☐
- 3) Glibenclamide is excreted unchanged by the kidney ☐
- 4) Gliclazide inhibits gluconeogenesis ☐
- 5) Metformin inhibits hepatic gluconeogenesis ☐

Chlorpropamide like all the other sulphonylureas stimulate pancreatic insulin secretion. They undergo hepatic metabolism then renal excretion. Acarbose is an alpha glucosidase inhibitor which inhibits the splitting of disaccharides into glucose and so inhibits glucose absorption from the gut. Metformin is an insulin sensitiser and although its actions are not fully understood its main role appears to be through inhibition of hepatic gluconeogenesis.

26- A 44 year old male with Child's grade C cirrhosis presented with haematemesis. Which one of the following drugs, administered intravenously, would be the most appropriate, immediate, treatment?

- 1) Isosorbide dinitrate. ☐
- 2) Omeprazole. ☐
- 3) Propranolol ☐
- 4) Somatostatin ☐
- 5) Tranexamic acid. ☐

The suggestion is that this patient is at particularly high risk of oesophageal varices. Child's classification of cirrhosis is a points scale based upon ascites/bilirubin etc reflecting prognosis. Graded depending upon the points scored from A-C with C reflecting greatest risk. Somatostatin acts to reduce portal pressures and has been demonstrated to be as effective as endoscopy at controlling variceal bleeding in the acute setting. Beta-blockers can be used as oral prophylaxis for oesophageal varices. IV Omeprazole has also been shown to be effective in reducing mortality in GI haemorrhage of any cause (NEJM 2002) but somatostatin may be expected to be superior for the above patient.

27- A 25 year old male homosexual is admitted with dyspnoea and weight loss of 2 months duration. He is diagnosed with *Pneumocystis pneumoniae* due to AIDS. Which of the following concerning *Pneumocystis pneumonia* is true?

- 1) May have an extra pulmonary presentation ☐
- 2) is always associated with X-ray changes ☐
- 3) is caused by a bacterium ☐
- 4) elevated serum antibodies to *P. carinii* helpful diagnostically ☐
- 5) is best treated with intravenous pentamidine ☐

a-Any HIV associated condition. b-5-15% have normal CXR (always is always false ... but not always!). c-A fungus. d-There is polyclonal B-cell activation in AIDS. e-intravenous cotrimoxazole. (Dr Shu Ho)

28- A 68-year-old lady with mitral valve disease and atrial fibrillation is taking warfarin. Lately her INR has fallen and the dose of warfarin has had to be increased.

Which of the following new treatments may account for this change?

- 1) Allopurinol ☐
- 2) Amiodarone ☐
- 3) Clarithromycin ☐
- 4) Sertraline ☐
- 5) St John's wort ☐

The metabolism of warfarin has been increased since it is becoming less effective. St John's Wort is an enzyme inducer. The other drugs are enzyme inhibitors.

29- You are an occupational health physician and have been asked by an anxious employee about contraindications to pertussis immunisation. Which of the following is a contraindication?

- 1) Eczema ☐
- 2) Cow's milk protein intolerance. ☐
- 3) Fever to 39.5°C following the first dose. ☐
- 4) Redness of >2.5cm at the injection site after the first dose. ☐
- 5) Hydrocephalus ☐

True contraindications to pertussis immunisation include:

Acute illness - until recovered.

Previous reaction to pertussis:

Local: an extensive area of redness and swelling which becomes indurated, involving most of the anterolateral surface of the thigh or a major part of the circumference of the upper arm.

General: fever equal to or more than 39.5°C within 48 hours of vaccine, anaphylaxis, bronchospasm, laryngeal oedema, generalised collapse, prolonged hyporesponsiveness, prolonged inconsolable or high-pitched screaming of >4 hours, convulsions or encephalopathy occurring within 72 hours.

A personal family history of allergy is not a contraindication, nor are stable neurological conditions such as cerebral palsy or spina bifida. In patients who have had a previous reaction, immunisations should be completed with DT vaccine, and acellular vaccine considered.

30 - Which of the following is true regarding the action of Clopidogrel?

- 1) It inhibits cyclo-oxygenase ☐
- 2) It is an ADP receptor antagonist ☐
- 3) It is a glycoprotein IIb/IIIa inhibitor ☐
- 4) It is a selective factor Xa inhibitor ☐
- 5) It is Hydroxymethyl Coenzyme A inhibitor ☐

Clopidogrel prevents platelet aggregation through antagonism of the ADP receptor. It has been shown to reduce mortality from stroke and IHD in primary prevention studies.

31- A 2 week old male child is brought to casualty by his concerned parents with diarrhoea and vomiting. He is the first child of a young couple. Examination reveals few features besides obvious dehydration. He is noted to have a penile length of 3.5cms. Which of the following is the most appropriate initial treatment for this patient?

- 1) Cow's milk allergy is the most likely diagnosis ☐
- 2) gluten-enteropathy should be excluded ☐
- 3) Requires urgent treatment with oral steroids ☐
- 4) Requires urgent treatment with IV normal saline ☐
- 5) Rota virus gastroenteritis is the most likely diagnosis ☐

The history suggests a diagnosis of classical congenital adrenal hyperplasia which is commonly due to 21 hydroxylase deficiency. A variable presentation is typical but neonatal presentations include salt losing crisis, penile development in the male virilisation and ambiguous genitalia in females. Patients should initially be resuscitated with fluid, usually saline and if suspicious, urgent biochemistry requested for cortisol, 17OHP etc prior to administration of intravenous steroids.

32- A 75 year old man was admitted after been found collapsed in a garden shed surrounded by a number of empty containers. On clinical examination the patient had small pupils, a heart rate of 50 beats per minute, and was frothing at the mouth. What is the most likely diagnosis?

- 1) Creosote poisoning. ☐
- 2) Glyphosate poisoning. ☐
- 3) Organophosphorus poisoning. ☐
- 4) Paraquat poisoning. ☐
- 5) Pyrethroid poisoning. ☐

The patient has cholinergic features with a relative bradycardia, small pupils and increased salivation. This is highly suggestive of organophosphorus poisoning which as an anticholinesterase inhibitor, thus prolonging the effects of acetylcholine.

Paraquat is associated with nausea vomiting and diarrhoea with ulceration. Creosote is a petroleum based substance and would not have such an effect. Glyphosate herbicides produces nausea, vomiting and diarrhoea with a caustic effect in the mouth. Pyrethroid is an insecticide and poisoning is rare but associated with coma, convulsions and pulmonary oedema.

33- Which of the following is a true of cutaneous anthrax?

- 1) causes a black eschar which overlies pus ☐
- 2) lesions are usually painful and tender ☐
- 3) lesions are associated with marked oedema ☐
- 4) Mortality is approximately 20% despite antibiotic therapy ☐
- 5) Is very likely to occur in subjects exposed to anthrax spores ☐

Anthrax is caused by B Anthracis a gram positive rod. Cutaneous anthrax is associated with a black eschar without pus, tend to be painless and have widespread oedema. Without antibiotics mortality is of the order of 20%, but with antibiotics, mortality is low, which contrasts with pulmonary anthrax.

34- A young woman has acne and is taking oral medication. She develops polyarthrititis and raised liver enzyme tests. Investigations show

AST 95

ALT 170

bilirubin 16

antinuclear antibodies strongly positive at 1/640, negative at 1/20

Which of the following drugs is she most likely to have been prescribed?

- 1) erythromycin ☐
- 2) isotretinoin ☐
- 3) minocycline ☐
- 4) oxytetracycline ☐
- 5) trimethoprim ☐

Except trimethoprim all other drugs are used in the treatment of acne. And all of these can cause hepatotoxicity. Erythromycin usually causes cholestasis. Minocycline can cause drug induced SLE.

35- A 74-year-old man with a thirty year history of psoriasis presented with generalised erythroderma of 3 days duration. Examination reveals him to be shivering but otherwise is well. He was treated as an inpatient with emollients and attention to fluid replacement and temperature control but failed to improve after five days. What is the most appropriate next treatment?

- 1) Oral hydroxychloroquine ☐
- 2) Oral methotrexate ☐
- 3) Oral prednisolone ☐
- 4) Topical coal tar ☐
- 5) Topical dithranol ☐

Erythroderma is an emergency as patients are susceptible to profound dehydration, infection and hypothermia. Methotrexate would be the only correct treatment for someone with erythrodermic psoriasis. Steroids could lead to unstable pustular psoriasis and would not generally work. Hydroxychloroquine has little effect on psoriasis. Topical coal tar and dithranol are good treatments for chronic plaque psoriasis but are highly irritant and would make the erythroderma much more inflamed and deteriorate his condition.

36- A previously fit, 30-year-old female presents with a four day history of intractable pruritus and urticaria. What is the most appropriate initial management?

- 1) Chlorpheniramine ☐
- 2) Prednisolone ☐
- 3) Ranitidine ☐
- 4) Topical hydrocortisone ☐
- 5) topical mepyramine ☐

Urticaria is a common condition and usually responds very well to systemic antihistamines which the correct first line treatment. Oral steroids can be given for severe cases but only as a last resort and topical steroids/ topical antihistamines have no effect.

37- Cannabinoids. Which is the incorrect statement?

- 1) Bioavailability after oral administration is about 16% ☐
- 2) Inhibit eicosanoid synthesis ☐
- 3) Lower intraocular pressure ☐
- 4) Naloxone blocks the antinociceptive actions of cannabinoids ☐
- 5) 9-tetrahydrocannabinol is an active constituent of the resin ☐

Cannabinoids are derived from the resin of Cannabis sativa and 9-tetrahydrocannabinol(9-THC) is its most important pharmacologically active constituent. Its bioavailability after oral ingestion is about 6%. Naloxone and other opioid receptor antagonists block the analgesic actions of cannabinoids. Synthetic cannabinoids reduce arachidonic acid-induced inflammation by inhibiting eicosanoid production.

38- With which of the following is hyperprolactinaemia associated?

- 1) Cabergoline therapy ☐
- 2) Depression ☐
- 3) Fluoxetine therapy ☐
- 4) Hyperthyroidism ☐
- 5) Sheehan's syndrome ☐

Hyperprolactinaemia may be manifest by a milky discharge from the breasts. Causes include, prolactinoma, hypothyroidism (far increased TRH), Non-functional tumour with stalk compression and drugs in particular dopamine antagonists such as chlorpromazine, haloperidol and domperidone. Pregnancy is a particularly common

cause of hyperprolactinaemia. Other drugs that are occasionally reported include SSRIs. PCOs is often associated with idiopathic hyperprolactinaemia.

39- A 35 year old woman with alcoholic cirrhosis is admitted with deteriorating encephalopathy and abdominal discomfort. An ascitic tap revealed a polymorphonuclear cell count of 350 cells per mm³.

Which of the following is the most appropriate therapy?

- 1) Intravenous amoxicillin ☐
- 2) Intravenous cefotaxime ☐
- 3) Intravenous metronidazole ☐
- 4) Oral neomycin ☐
- 5) Oral norfloxacin ☐

This lady has Spontaneous Bacterial Peritonitis as suggested by the typical history, ascites and raised polymorphonuclear count within the ascitic tap. It is most commonly seen in alcoholic cirrhosis and the causative organism is usually E. Coli, Klebsiella, S Pneumoniae or Enterococci. (Compare this with the mixed growth seen in other forms of peritonitis). Sending some ascitic fluid in blood culture bottles increases the yield. Initial treatment is with broad spectrum antibiotics such as cefotaxime. Norfloxacin is recommended for short term prophylaxis.

40- Which of the following is a feature of Vancomycin-resistant enterococci?

- 1) cause resistant infective diarrhoea ☐
- 2) produce an enzyme that inactivates vancomycin ☐
- 3) may be found in healthy community volunteers not recently hospitalized ☐
- 4) high dose ampicillin is the treatment of choice ☐
- 5) are commonly vancomycin-dependent ☐

a-When they cause clinical problems they are usually UTI, bacteraemia, wound infections, neonatal infections, endocarditis etc. b-They alter peptidoglycan precursors used to build cell walls. Vancomycin binds to D-ala-D-ala but the resistant enterococci have D-ala-D-lac or D-ala terminating precursors. They acquire genes that produce enzymes to change the precursors. c-2% in UK general practice, 28% in Belgium. Community reservoir in meat, poultry and ?cheese. d-only if the MIC of ampicillin is not too high. Anecdotal evidence exists for its use in E. faecalis endocarditis. (20g / day) e-Some strains only. An explanation for this curious process is that there is an inability to produce cell walls because the vancomycin-sensitive precursor genes have been turned off and the resistant ones only appear in the presence of vancomycin. (Source: Am J Med 1997;102:284-293)

41- Which one of the following is a recognised treatment option in poisoning?

- 1) ethanol for isopropyl alcohol poisoning ☐
- 2) glucagon for cocaine poisoning ☐
- 3) methylene blue for cyanide poisoning ☐
- 4) N-acetylcysteine in paraquat poisoning ☐
- 5) pralidoxime in sarin (nerve gas) poisoning ☐

Sarin is an organophosphorus. Pralidoxime reactivates acetyl cholinesterase enzyme. Should be used in the first few hours.

Ethanol reduces the formation of toxic metabolites produced after ingestion of methanol and ethylene glycol. Glucagon is used in symptomatic beta-blocker overdose. N-acetylcysteine is used in paracetamol overdose. Methylene blue is the antidote for serious methaemoglobinaemia.

42- A 78 year old female is referred by her GP with high blood pressure. Over the last three months her blood pressure is noted to be around 180/80 mmHg. She has a body mass index of 25.5kg/m², is a non-smoker. There are no features to suggest a secondary cause for her hypertension. Which of the following is the most appropriate treatment for her blood pressure?

- 1) Alpha-Blocker ☐
- 2) Angiotensin Converting Enzyme (ACE) Inhibitor ☐
- 3) Angiotensin Blocker ☐
- 4) Beta-blocker ☐
- 5) Calcium channel blocker ☐

This patient has isolated systolic hypertension (systolic BP >160 and diastolic BP <90) which is the typical hypertension in the elderly population and is associated with a greater risk than combined systolic/diastolic hypertension. Based upon studies such as SHEP and Syst-Eur, guidelines suggest treatment with either Calcium antagonists or diuretics.

43- A 56 year old male with left ventricular systolic dysfunction was dyspnoeic on climbing stairs but not at rest. The patient was commenced on ramipril and frusemide.

Which one of the following drugs would improve the patient's prognosis?

- 1) Amiodarone ☐
- 2) Amlodipine ☐
- 3) Bisoprolol ☐
- 4) Digoxin ☐
- 5) Nitrate therapy ☐

This patient has NYHA stage II heart failure. Studies such as CIBIS-II and MERIT-HF reveal that beta-blockers significantly reduce morbidity and mortality in heart failure.

44- A 70 year old female is admitted 12 hours after taking an overdose of aspirin. Investigations revealed: Serum sodium 138 mmol/L (137-144), Serum potassium 5.9 mmol/L (3.5-4.9), Serum bicarbonate 14 mmol/L (20-28), Serum urea 18.1 mmol/L (2.5-7.5), Serum creatinine 238 umol/L (60-110), Serum salicylate 1120 mg/L (8 mmol/L). What is the most appropriate treatment of this patient?

- 1) Haemodialysis ☐
- 2) Haemofiltration ☐
- 3) Intravenous sodium bicarbonate. ☐

- 4) Peritoneal dialysis. ☐
- 5) Urine alkalization. ☐

This patient is at major risk of aspirin toxicity as reflected by the excessive aspirin concentration and appears to have developed acute renal failure –is acidotic with an elevated potassium. Bicarbonate is recommended as a supportive therapy but in this patient, Haemodialysis is the treatment of choice. The latter is advised when the plasma-salicylate concentration is greater than 700 mg/litre (5.1 mmol/litre) or in the presence of severe metabolic acidosis as recommended within the BNF poisons section.

45- A 40-year-old man attending a routing screening has a blood pressure of 166/100 mmHg. Two weeks later his blood pressure was 150/90 mmHg. He does not smoke. He drinks 35 units alcohol / week. His body mass index (BMI) is 30 kg/m² (20 - 25). What is the best management strategy?

- 1) amlodipine ☐
- 2) atenolol ☐
- 3) bendrofluazide ☐
- 4) enalapril ☐
- 5) lifestyle advice ☐

This 40 year old male has Grade 2 obesity as evidenced by his body mass index (Grade 1 = 25-30 , Grade 2 = 30-40 and Grade 3 = > 40). Hypertension in this individual is most likely due to obesity-related hypertension or due to pseudo-cushings syndrome in view of his high alcohol intake and increased BMI. Heightened sympathetic nervous system activity, hyper-insulinemia, insulin resistance, and hyperleptin-emia contribute to obesity-related hypertension.

He needs lifestyle advice about reducing his alcohol intake and a compatible dietary advice to reduce his weight.

46- In a chronic disease which has no known effective treatment, a new treatment is known to be effective in animal models and shows promise in short-term studies in patients.

There are some theoretical concerns about toxicity involving liver and bone marrow although no cases have been observed in studies so far.

What is the most appropriate next step in the drug's development?

- 1) case control study ☐
- 2) No further studies should be done and drug development should be stopped ☐
- 3) open study ☐
- 4) randomised double blind placebo controlled study ☐
- 5) randomised single blind placebo controlled study ☐

The story that is described is of an early drug development that has gone through phase I trials. The next logical step is to study the risks, potential benefits and

monitoring procedures with a phase II trial. The only option that fits this is the 'open study'. The randomised controlled trials would test a new drugs efficacy against an established treatment. A case-control study would be useful for an already established drug and 'no further studies' seems a little too pessimistic!

47- Which of the following compounds has a vasodilating effect?

- 1) Antidiuretic hormone ☐
- 2) Calcitonin ☐
- 3) Endothelin ☐
- 4) Renin ☐
- 5) Somatostatin ☐

ADH acts on the Vasopressor receptors to cause vasoconstriction. Endothelin is also a vasoconstrictor as is renin. Somatostatin is also recognised to produce vasoconstriction of the splanchnic system.

48- In malignant hyperpyrexia:

- 1) A mortality rate of 20% may be expected ☐
- 2) Elevation of serum creatine kinase and myoglobinuria is diagnostic ☐
- 3) Muscle biopsy may be histologically normal ☐
- 4) The only available specific treatment is sodium dantrolene, which has a neutral pH ☐
- 5) The predisposing gene is thought to be on chromosome 9 ☐

Malignant hyperpyrexia (MH) is characterised by increased temperature and muscle rigidity during anaesthesia, which results from abnormal skeletal muscle contraction and increased metabolism. The predisposing gene is thought to be on chromosome 19, close to the gene for the ryanodine / dihydropyridine receptor complex. Known triggering agents include the volatile anaesthetic agents and suxamethonium. Patients show different sensitivity to the triggering agents and the reaction can be delayed by several hours. Intravenous dantrolene (up to 10mg/Kg) is the only available specific treatment. The solution has a pH of 9 to 10. The prognosis is good when the appropriate treatment is instigated early, mortality being <5% (prior to dantrolene the mortality was 80%). Serum creatine kinase elevation and myoglobinuria are suggestive but not diagnostic of MH. Myoglobin and creatine kinase are both known to increase after giving suxamethonium to normal patients. Contracture tests using caffeine and halothane are the investigations of choice. Muscle biopsies may appear histologically normal.

Therapeutics

1- Which of the following anti-microbials is associated with prolongation of the QT interval?

- 1) Co-amoxiclav ☐
- 2) Gentamicin ☐
- 3) Cefuroxime ☐
- 4) Erythromycin ☐
- 5) Isoniazid ☐

The macrolides are associated with a prolongation of the QT interval. Other antimicrobials associated with prolonged QT include quinine, levofloxacin.

2- A study has been designed to investigate whether a certain drug plus physiotherapy treatment is better than drug treatment alone in the management of rheumatoid arthritis. After randomizing the patients a small proportion of the drug plus physiotherapy group decide to drop out of the study or omit some treatment sessions specified in the research protocol. What is the correct way of analysing the subsequent data?

- 1) Assume the patients have withdrawn their consent ☐
- 2) Exclude these patients from all analysis ☐
- 3) Extend the trial recruitment to make up the numbers ☐
- 4) Include these patient outcomes in the drug plus physiotherapy group ☐
- 5) Interview the patients and report their group separately ☐

This is the principle of 'intention to treat'. It is possible that the physiotherapy intervention was harmful to the patients and this is why they left. Intention to treat helps to reduce bias by sticking to the original allocation of treatment and analyzing the patient in that treatment group even (and concentrate for this bit) even if they don't get it!

3- Useful therapy for improving fertility in Polycystic ovarian syndrome include

- 1) Cyproterone acetate ☐
- 2) Ethinyl oestradiol ☐
- 3) Metformin ☐
- 4) Glibenclamide ☐
- 5) Spironolactone ☐

Metformin has been shown to increase the rate of conception in PCOs through improved insulin sensitivity. Ethinylloestradiol and cyproterone acetate combine to form Dianette the oral contraceptive. Spironolactone is used for hirsutism but is teratogenic. Glibenclamide is not used in PCOs.

4- A 45 year old male type 1 diabetic with a number of complex diabetic gastrointestinal complications is noted to have a PR interval of 0.18s, a QRS duration of 0.1s and a QT interval of 0.48s on routine ECG. Which of the following drugs may be responsible?

- 1) Cisapride ☐
- 2) Octreotide ☐
- 3) Co-trimoxazole ☐
- 4) Domperidone ☐
- 5) Cimetidine ☐

Cisapride has been withdrawn due to the problem of prolonged QT interval and torsades de pointe. Prolonged QT is defined as greater than 0.45s. Other agents include amitriptyline and phenothiazines yet metoclopramide and domperidone are

not associated.

5- Which of the following is true of radioactive iodine (¹³¹I) therapy?

- 1) Causes hypothyroidism in 90% of treated patients within 3 months ☐
- 2) Causes a deterioration in ophthalmopathy in patients with Graves disease ☐
- 3) Is associated with a subsequently increased risk of infertility ☐
- 4) Is associated with an increased risk of thyroid lymphoma ☐
- 5) Is the preferred treatment in amiodarone induced thyrotoxicosis ☐

RAI is associated with the induction of hypothyroidism in the majority of subjects by 3 months (70%) with 10% failing at the first dose at about 18 months. It may precipitate deterioration in ophthalmopathy in patients with Graves. There is no evidence of either increased risk of infertility or lymphoma after RAI with evidence suggesting that it is quite safe. Withdrawing amiodarone is the preferred treatment in amiodarone induced thyrotoxicosis and often the iodine uptake would be low in these patients making ¹³¹I therapy unhelpful.

6- Erythropoietin therapy causes

- 1) Benign intracranial hypertension ☐
- 2) Myositis ☐
- 3) Hypotension ☐
- 4) Seizures ☐
- 5) Osteoporosis ☐

Hypertension is a frequent problem and may induce seizures. A particular symptom is the onset of sudden stabbing migraine-like headache and should raise awareness to the possibility of hypertensive crisis. Other adverse effects of treatment with erythropoietin include hyperkalaemia in uraemic patients, increased PCV (especially with misuse by normal individuals), thrombocythaemia, shunt thrombosis, induction of iron deficiency, skin rashes, urticaria and flu-like illness.

7- Which of the following is a feature of Vancomycin-resistant enterococci?

- 1) cause resistant infective diarrhoea ☐
- 2) produce an enzyme that inactivates vancomycin ☐
- 3) may be found in healthy community volunteers not recently hospitalized ☐
- 4) high dose ampicillin is the treatment of choice ☐
- 5) are commonly vancomycin-dependent ☐

a-When they cause clinical problems they are usually UTI, bacteraemia, wound infections, neonatal infections, endocarditis etc. b-They alter peptidoglycan precursors used to build cell walls. Vancomycin binds to D-ala-D-ala but the resistant enterococci have D-ala-D-lac or D-ala terminating precursors. They acquire genes that produce enzymes to change the precursors. c-2% in UK general practice, 28% in Belgium. Community reservoir in meat, poultry and cheese. d-only if the MIC of ampicillin is not too high. Anecdotal evidence exists for its use in E. faecalis endocarditis. (20g / day) e-Some strains only. An explanation for this curious process is that there is an inability to produce cell walls because the vancomycin-sensitive

precursor genes have been turned off and the resistant ones only appear in the presence of vancomycin. (Source: Am J Med 1997;102:284-293)

8- Oral therapy with which of the following may cause galactorrhoea?

- 1) Bromocriptine ☐
- 2) Cabergoline ☐
- 3) Spironolactone ☐
- 4) Cimetidine ☐
- 5) Domperidone ☐

Domperidone is a dopamine antagonist producing large rises in prolactin concentrations. Spironolactone has no effect on prolactin and Cimetidine produces hyperprolactinaemia only when given IV. Both bromocriptine and cabergoline are dopamine agonists and reduce prolactin.

9- Which of the following is currently recommended as the drug of choice in treating refractory ventricular fibrillation or pulseless ventricular tachycardia?

- 1) Adenosine ☐
- 2) Amiodarone ☐
- 3) Bretyllium ☐
- 4) Lignocaine ☐
- 5) Magnesium ☐

300mg of amiodarone made up to 20ml with 5% dextrose given as an intravenous bolus is the drug of choice. 100mg of lidocaine may be given intravenously when amiodarone is unavailable. Historically 5mg / Kg of Bretyllium was given, but it is no longer recommended.

10- A 55 year old man presents with gynaecomastia while receiving treatment for Heart failure.

Which of the following drugs is most likely to be the cause of his gynaecomastia?

- 1) Amiloride ☐
- 2) Carvedilol ☐
- 3) Frusemide ☐
- 4) Omeprazole ☐
- 5) Ramipril ☐

Omeprazole is associated with gynaecomastia.

11- An elderly man with a history of asthma, congestive heart failure, and peptic ulcer disease is admitted with bronchospasm and rapid atrial fibrillation. He receives frequent nebulised salbutamol and IV digoxin loading, his regular medications are continued. 24 hours after admission his serum potassium is noted to be 2.8 mmol/l. Which of his medications is most likely to have caused this abnormality.

- 1) Digoxin ☐
- 2) ACE inhibitor ☐

- 3) Salbutamol ☐
- 4) Ranitidine ☐
- 5) Spironolactone ☐

Salbutamol given in regular nebulised doses or IV is commonly associated with hypokalaemia. Spironolactone and ACE inhibitors commonly cause hyperkalaemia (their use in combination is potentially dangerous and requires regular monitoring of serum electrolytes). Electrolyte disturbance with Ranitidine is very uncommon. Digoxin doesn't cause hypokalaemia (unless due to vomiting associated with digoxin toxicity). Hypokalaemia (usually diuretic induced) does increase cardiac sensitivity to Digoxin and correction of hypokalaemia is recommended to avoid arrhythmias.

12- A 24-year-old man presents with a headache that has been present for nine months. He has headache almost every day, mainly frontal, sometimes with nausea. Current medication includes paracetamol, brufen and codeine with only transient relief of symptoms. He has a history of depression. Examination was normal.

What is the most likely diagnosis?

- 1) analgesic misuse headache ☐
- 2) cluster headache ☐
- 3) frontal brain tumour ☐
- 4) headache due to depression ☐
- 5) migraine ☐

This is one of the commonest cause of chronic daily headache (the commonest is chronic tension type headache). It is commonly caused by the chronic use of analgesics such as codeine phosphate and paracetamol). Treatment consists of reducing the amount of analgesics gradually until stopped.

13- A 68 year old woman was admitted to hospital with evidence of biventricular cardiac failure. On examination her pulse was 100 beats per minute (sinus rhythm), and her blood pressure was 140/60 mmHg. She had haemorrhages in both fundi. Her condition improved after intravenous diuretics.

Investigations revealed:

haemoglobin 5.6 g/dl (11.5 – 16.5)
 haematocrit 0.19 (0.36 – 0.47)
 MCV 118 fl (80 – 96)
 MCH 33.0 pg (28 – 32)
 WCC $3.4 \times 10^9/L$ (4 – 11)
 platelet count $95 \times 10^9/L$ (150 – 400)

What is the next most appropriate step in management?

- 1) blood transfusion ☐
- 2) bone marrow aspiration ☐
- 3) intramuscular vitamin B12 alone ☐
- 4) intramuscular vitamin B12 and oral folic acid together ☐

5) oral folic acid alone ☐

The clinical picture represents severe megaloblastic anaemia with cardiac failure. The investigations do not mention anything about B12 or Folate assays. So the next step would be to take blood for these assays and a bone marrow aspiration to identify the cause for the anaemia and then to start large doses of intramuscular vitamin B12 and oral folic acid. (ref: OTM)

Giving oral folic acid without Vitamin B12 would be hazardous and could precipitate subacute combined degeneration of the spinal cord. Transfusion may also be hazardous in a patient with severe CCF

14- With regard to poisoning / overdose:

- 1) Phenobarbitone causes a metabolic acidosis ☐
- 2) Ethylene glycol causes a metabolic alkalosis and renal failure ☐
- 3) Aspirin causes acidosis due to hypoventilation ☐
- 4) Methanol causes a metabolic acidosis with an increased anion gap ☐
- 5) Chlormethiazole causes hyperthermia and hypertension ☐

Aspirin causes hyperventilation which may result in a respiratory alkalosis, massive overdose may cause a metabolic acidosis. Phenobarbitone & Chlormethiazole both suppress the CNS causing hypoventilation, hypotension & hypothermia. Ethylene glycol causes a metabolic acidosis. Methanol is metabolised to formaldehyde and formic acid.

15- Which of the following is NOT associated with hyponatraemia and hyperkalaemia?

- 1) Acute hypoadrenalism ☐
- 2) Carbenoxolone therapy ☐
- 3) Co-Amilorfruse therapy ☐
- 4) Congestive cardiac failure. ☐
- 5) Type IV renal tubular acidosis ☐

Carbenoxolone therapy may be associated with hypokalaemia and salt retention due to pseudohypoaldosteronism through inhibition of the enzyme 11 beta Hydroxysteroid dehydrogenase. Type IV renal tubular acidosis is associated with hyporeninaemic hypoaldosteronism and both hyponatraemia and hyperkalaemia can occur. Hypoadrenalism is associated with hyperkalaemia and hyponatraemia as is Cardiac failure, hepatic and renal failure. Co-amilorfruse the combination of amiloride and frusemide may also produce this biochemical picture.

16- A 55-year-old woman was found to have ++ glycosuria and had a maternal history of Type II diabetes mellitus. She was a smoker of 20 cigarettes per day. Examination reveals no specific abnormalities apart from a BMI of 30. Blood pressure was 132/88 mmHg. Investigations reveal:
serum creatinine 80 μ mol/L (60 – 110)
plasma glucose (fasting) 11.3 mmol/L (3.0 – 6.0)

total serum cholesterol 5.5 mmol/L (<5.2)

HDL cholesterol 1.4 mmol/L (>1.55)

What is most likely to improve her life expectancy?

- 1) Metformin 500 mg bd ☐
- 2) Ramipril 10 mg daily ☐
- 3) Simvastatin 10 mg daily ☐
- 4) Stopping smoking ☐
- 5) Weight loss to achieve a BMI of 25 ☐

She is diabetic and obese as defined by her BMI of 30. She is most prone to risk of cardiovascular disease and the best thing that she could do to improve mortality would be to quit smoking.

Stopping smoking is the first priority ... even if it causes further weight gain. Drugs such as 'reductil' can be used to help patients limit weight gain when stopping smoking.

Smoking is associated with a cardiovascular risk of 6x in women and 3x in men. Stopping smoking (after an MI) reduces the risk of recurrent MI by 50%.

(Njolstad I, Arnesen E, Larsen PG, Smoking, serum lipids blood pressure and sex difference in myocardial infarction. Circulation 1996; 93:450

Presco E, Hipp M, Schnohr P, et al. Smoking and the risk of myocardial infarction in women and men. BMJ, 1998; 316: 1043)

17- Baclofen

- 1) acts directly on skeletal muscle ☐
- 2) causes rhabdomyolysis ☐
- 3) reduces cerebral but not spinal spasticity ☐
- 4) cause hallucinations when withdrawn ☐
- 5) reduce Ca²⁺ release from sarcoplasmic reticulum ☐

Primary site of action is the spinal cord, by depressing monosynaptic and polysynaptic transmission. It can hyperpolarise cells by increasing K⁺ conductance and inhibit Ca²⁺ channels in others. Rhabdomyolysis caused by clofibrate, aminocaproic acid, HMGCoA reductase inhibitors and neuroleptics (neuroleptic malignant syndrome). Avoid abrupt withdrawal as it can cause serious side-effects including autonomic dysreflexia.

18- Which one of the following is correct regarding long-acting beta-2 agonists?

- 1) Can be used to prevent activity-induced symptoms without anti-inflammatory therapy. ☐
- 2) Become less effective over time (tolerance). ☐
- 3) Are beneficial in acute viral croup. ☐
- 4) Protect against allergen challenge for up to 48 hours. ☐
- 5) Should not be used in association with erythromycin. ☐

Long-acting beta-2 agonists, e.g. salmeterol, can be used twice daily to assist in prophylaxis in chronic asthma as Step 3 of the British Thoracic Society Asthma Guidelines. There is no evidence that the bronchodilator effect wanes with time, though there is debate that it may become less effective in protecting against exercise or methocoline induced bronchospasm. Its duration of action is around 12 hours, and has gone completely by 36 hours. Aminophylline interacts with erythromycin, giving an increased risk of toxicity. There is no evidence that salmeterol works in viral croup, though oral steroids are highly effective.

19- A 50-year-old lady suffers with migraine. She smokes 20 cigarettes a day. She has found that paracetamol 1 g was not always effective in relieving her pain. Which of the following factors is the most likely to account for this problem?

- 1) altered volume of distribution ☐
- 2) delayed gastric emptying ☐
- 3) first pass metabolism ☐
- 4) hepatic enzyme induction ☐
- 5) reduced gut blood flow ☐

Paracetamol absorption is reduced during migraine attacks and reduced absorption is associated with increased nausea. There is evidence that delayed gastric emptying is to blame. (Tokola RA, Neuvonen PJ. Effect of migraine attacks on paracetamol absorption. Br J Clin Pharmacol 1984 Dec;18(6):867-71). In fact the paracetamol absorption technique is used to study gastric emptying.

Enzyme induction with cigarette smoking does affect paracetamol metabolism. Its importance however, is in toxicity. Smokers would be classified as in a high risk paracetamol overdose and are assessed using a different time - paracetamol level curve.

20- In the treatment of osteoporosis, which of the following best describe the drug Raloxifene?

- 1) A Bisphosphonate ☐
- 2) A Calcium Receptor Modulator ☐
- 3) An Estrogen ☐
- 4) A PTH receptor agonist ☐
- 5) A Selective Estrogen Receptor Modulator ☐

Raloxifene is the first of the so-called Selective Estrogen Receptor Modulators. There are fundamentally two types of estrogen receptor, alpha and beta, distributed at locations such as breast, uterus, bone and in the vasculature. Raloxifene acts as an estrogen agonist at some sites eg Bone to increase mineralisation but acts as an antagonist at other sites eg uterus/breast (preventing endometrial/breast hyperplasia).

21- In which of the following have randomised controlled trials shown that long-term oxygen therapy (LTOT) reduces mortality?

- 1) Asthma ☐

- 2) Cor pulmonale due to chronic airflow obstruction ☐
- 3) Cryptogenic fibrosing alveolitis ☐
- 4) Cystic fibrosis ☐
- 5) Pulmonary sarcoidosis ☐

Adequate data for LTOT prolonging survival exists only for COPD although in practice it is assumed to apply in other chronic hypoxaemic lung conditions.

22- A firm 2 to 3 cm mass is palpable in the upper outer quadrant of the right breast of a 52-year-old woman. There are no palpable axillary lymph nodes. A lumpectomy with axillary node dissection is performed and the breast lesion is found to have positive immunohistochemical staining for HER2/neu (c-erb B2). Staining for oestrogen and progesterone receptors is negative. Which of the following additional treatment options is most appropriate, based upon these findings?

- 1) Radical mastectomy ☐
- 2) St John's wort ☐
- 3) Tamoxifen ☐
- 4) Trastuzumab ☐
- 5) Vancomycin ☐

This is an infiltrating ductal carcinoma. The lack of Oestrogen Receptor staining suggests a poor response to hormonal therapy with tamoxifen. The positive C-erb B2 (HER2/neu) staining suggests that trastuzumab (Herceptin) may be effective.

23- Which of the following is the oral hypoglycaemic agent Rosiglitazone?

- 1) A Peroxisome Proliferator Activating Receptor (PPAR)-alpha agonist ☐
- 2) A Peroxisome Proliferator Activating Receptor (PPAR)-gamma agonist ☐
- 3) A Sulphonylurea ☐
- 4) A Biguanide ☐
- 5) An alpha-Glucosidase inhibitor ☐

Rosiglitazone is a new class of oral hypoglycaemic agent being a PPAR gamma agonist. Through activation of this receptor it modulates adipocyte function and improves insulin sensitivity.

24- Which of the following is true concerning oral hypoglycaemic agents?

- 1) Acarbose promotes insulin secretion in response to meals ☐
- 2) Chlorpropamide induces liver enzymes ☐
- 3) Glibenclamide is excreted unchanged by the kidney ☐
- 4) Gliclazide inhibits gluconeogenesis ☐
- 5) Metformin inhibits hepatic gluconeogenesis ☐

Chlorpropamide like all the other sulphonylureas stimulate pancreatic insulin secretion. They undergo hepatic metabolism then renal excretion. Acarbose is an alpha glucosidase inhibitor which inhibits the splitting of disaccharides into glucose and so inhibits glucose absorption from the gut. Metformin is an insulin sensitiser and

although its actions are not fully understood its main role appears to be through inhibition of hepatic gluconeogenesis.

25- The following are the causes of drug induced hepatitis except:

- 1) Isoniazid ☐
- 2) Amiodarone ☐
- 3) Pyrazinamide ☐
- 4) Ethambutol ☐
- 5) Methyldopa ☐

Side effects of ethambutol are largely confined to visual disturbances in form of loss of acuity, colour blindness and restriction of visual fields. It does not cause hepatitis and is renally excreted. Isoniazid, amiodarone, pyrazinamide and methyldopa are a cause of drug induced hepatitis.

26- A 21 year old female with epilepsy is well controlled on sodium valproate 600mg bd and had been taking oral contraceptives for three years. She presented to her general practitioner 12 weeks pregnant.

Which of the following is correct?

- 1) An alternative anticonvulsant should be used in place of sodium valproate ☐
- 2) Interaction of sodium valproate with the oral contraceptive increased the risk of pregnancy ☐
- 3) The dose of sodium valproate should be increased ☐
- 4) There is an increased risk of a neural tube defect in her fetus ☐
- 5) She is at increased risk of anaemia in pregnancy ☐

There is an increased risk of neural tube defects associated with anti-convulsants during pregnancy. However, the risks associated with treatment are outweighed by the benefits in preventing seizures, so the drug should be continued. The risks may be minimised through use of folate supplements. Sodium valproate is not an enzyme inducer and would not speed up metabolism of the pill.

27- Which of the following antiarrhythmic drugs may be used in the treatment of long QT syndrome?

- 1) Amiodarone ☐
- 2) Atenolol ☐
- 3) Flecainide ☐
- 4) Propofanone ☐
- 5) Sotalol ☐

Betablockers are the mainstay of treatment in long QT syndrome. The most commonly used drugs are propranolol and nadolol but metoprolol and atenolol are also used. Implantable Cardioverter-Defibrillators are the most effective treatment in high risk cases. The others drugs may produce a prolongation of the QT interval exacerbating risk of polymorphic VT and Torsades de pointes. For a list of drugs see QTdrugs.org. For an example of long QT syndrome see ECGlibrary.com.

28- A new drug is being studied to find the most appropriate dose in a dose response study. Small doses of the drug lead to a linear increase in serum drug concentration. At higher doses there is an exponential rise in serum drug concentration. Which of the following best describes the pharmacokinetic properties of this new drug?

- 1) first order kinetics ☐
- 2) first pass effect ☐
- 3) long plasma half life ☐
- 4) saturation kinetics ☐
- 5) zero order kinetics ☐

The description of the kinetics of this new drug show that with small doses there is a linear response (first order kinetics) to dosing but this becomes saturated and the serum concentration of the drug rises sharply (zero order kinetics). This response is typical of drugs such as phenytoin (saturates liver metabolism).

29- Which of the following concerning the conjugation of bilirubin is correct?

- 1) is catalysed by a glucuronyl transferase ☐
- 2) occurs in the Kupfer cells of the liver ☐
- 3) is increased by valproate ☐
- 4) is inhibited by rifampicin ☐
- 5) is impaired in Dubin-Johnson syndrome ☐

b - Hepatocytes. c - Enzyme inhibitor. d - Enzyme inducer. e - Conjugation is OK but excretion from the hepatocyte into the bile is impaired. (Gilbert's syndrome - bilirubin can't Go in to the hepatocyte - unconjugated bilirubinaemia. Crigler-Najjar syndrome - bilirubin can't Conjugate - unconjugated bilirubinaemia. Dubin-Johnson syndrome - bilirubin can't Depart from the hepatocyte - conjugated bilirubinaemia.)

30- Which of the following doses of prednisolone is equivalent in its glucocorticoid potency to 20mg of hydrocortisone.

- 1) 2 mg ☐
- 2) 5 mg ☐
- 3) 10 mg ☐
- 4) 15 mg ☐
- 5) 20 mg ☐

It is important to know the relative potencies of the glucocorticoids. Dexamethasone for instance is roughly 30 times more potent than hydrocortisone.

31- A 33 year old epileptic female presents with visual problems. Examination reveals a constriction of visual fields to confrontation. Which of the following may be responsible for her visual deterioration?

- 1) Vigabatrin ☐
- 2) Lamotrigine ☐
- 3) Gabapentin ☐
- 4) Phenytoin ☐

5) Sodium Valproate ☐

Vigabatrin is associated with constricted visual fields and when detected therapy should be stopped.

32- A 2 week old male child is brought to casualty by his concerned parents with diarrhoea and vomiting. He is the first child of a young couple. Examination reveals few features besides obvious dehydration. He is noted to have a penile length of 3.5cms. Which of the following is the most appropriate initial treatment for this patient?

- 1) Cow's milk allergy is the most likely diagnosis ☐
- 2) gluten-enteropathy should be excluded ☐
- 3) Requires urgent treatment with oral steroids ☐
- 4) Requires urgent treatment with IV normal saline ☐
- 5) Rota virus gastroenteritis is the most likely diagnosis ☐

The history suggests a diagnosis of classical congenital adrenal hyperplasia which is commonly due to 21 hydroxylase deficiency. A variable presentation is typical but neonatal presentations include salt losing crisis, penile development in the male virilisation and ambiguous genitalia in females. Patients should initially be resuscitated with fluid, usually saline and if suspicious, urgent biochemistry requested for cortisol, 17OHP etc prior to administration of intravenous steroids.

33- Which of the following statements concerning the treatment of acute myocardial infarction is correct?

- 1) A pansystolic murmur developing within the first 24 hours does not require further investigation. ☐
- 2) Dipyridamole therapy reduces reinfarction within the first year. ☐
- 3) Heparin is beneficial if given with streptokinase. ☐
- 4) Prophylactic lignocaine given in the first 48 hours is effective in preventing ventricular fibrillation ☐
- 5) Treatment with a dihydropyridine calcium antagonist is associated with increased cardiovascular mortality. ☐

GISSI II revealed no survival advantage of heparin plus streptokinase in acute MI compared with strep alone. ISIS II revealed that dihydropyridine calcium antagonists were associated with increased cardiovascular risk after MI. Dipyridamole does not reduce risk. A newly discovered pansystolic murmur may signify acquired MR or VSD.

34- A 67 year old man presents with sudden onset atrial fibrillation (ventricular rate of 150/minute). His serum creatinine concentration was 250 $\mu\text{mol/L}$ (70-110). What is the main factor that determines the choice of loading dose of digoxin in this patient?

- 1) Absorption ☐
- 2) Apparent volume of distribution ☐
- 3) Lipid solubility ☐

- 4) Plasma half-life ☐
- 5) Renal clearance ☐

The pharmacokinetics of digoxin are complex and best explained by a two compartment model. The loading dose is mainly dependent on the Volume of Distribution of a drug but this patient has moderate renal failure. The loading dose is calculated (using various models) by taking into account age, creatinine clearance, body surface area etc. Volume of distribution becomes important particularly when body weight is 40kg or less. On balance it is the renal failure that is the most important factor in this patient in determining the loading dose.

Digoxin is cleared by the kidneys so the maintenance dose would require adjustment in renal failure.

35- Folic acid metabolism can be affected by

- 1) tetracycline ☐
- 2) pyrimethamine ☐
- 3) vitamin B12 ☐
- 4) penicillin ☐
- 5) brufen ☐

Drugs which inhibit dihydrofolate reductase = methotrexate, pyrimethamine and trimethoprim. Drugs which interfere with absorption/storage of folate = phenytoin, primidone, oral contraceptives.

36- Which ONE statement is true regarding the treatment of iron deficiency anaemia:

- 1) iron is absorbed in the distal jejunum ☐
- 2) absorption of iron is increased by ascorbic acid ☐
- 3) sustained release iron is a useful way of giving larger doses ☐
- 4) ferrous sulphate 200mg has less elemental iron than the same dose of ferrous gluconate ☐
- 5) parenteral iron is indicated when the anaemia responds slowly to oral iron ☐

1 - iron is absorbed in the upper small intestine. 2 - absorption of oral iron is improved by ascorbic acid. 3 - sustained release preparations may improve tolerance of oral iron but do not aid absorption. 4 - ferrous sulphate has more elemental iron by mass. 5 - parenteral iron acts no faster than oral iron. It is indicated when oral iron cannot be tolerated or is not absorbed.

37- Which of the following concerning Pityriasis rosea is correct?

- 1) It is due to a fungal infection ☐
 - 2) It is characterised by flat scaly patches ☐
 - 3) It is frequently associated with oro-genital itching ☐
 - 4) May be preceded by intense itching ☐
 - 5) Tends to recur after apparent cure ☐
-

Pityriasis rosea is a rash that can occur at any age but it occurs most commonly in people between the ages of 10 and 35 years. It is not caused by a fungus. The condition often begins as a large single pink patch on the chest or back. This patch may be scaly and is called a "herald" or "mother" patch. Within a week or two, more pink patches, sometimes hundreds of them, appear on the body and on the arms and legs. Patches may also occur on the neck, and though rare, the face.

38- A 76-year-old with a recent history of cerebral haemorrhage is admitted with a cough, worsening breathlessness and right pleuritic chest pain. He is also mildly pyrexial. His ventilation-perfusion scan reveals several areas of ventilation/perfusion mismatches. What is the most appropriate line of management?

- 1) aspirin therapy ☐
- 2) antibiotics ☐
- 3) inferior vena cava filter ☐
- 4) low molecular weight heparin treatment ☐
- 5) warfarin treatment ☐

This patient has PE following a recent haemorrhagic stroke. The risk of rebleeding into the stroke area is too high with anticoagulation. The best action would be percutaneous insertion of IVC filter which may be as effective as anticoagulation. It is used in cases where anticoagulation is a contraindication or in those in whom anticoagulation alone fails.

39- A 70 year old male was receiving amiodarone 200 mg daily for intermittent atrial fibrillation. However, he was aware of tiredness and lethargy. He appeared clinically euthyroid with no palpable goitre. Investigations revealed:

Serum free T4 23pmol/L (9-26)
Serum total T3 0.8 nmol/L (0.9-2.8)
Serum TSH 8.2 mU/L (<5)

Which of the following statements would explain these results?

- 1) Abnormal thyroxine binding globulin ☐
- 2) Amiodarone-induced hypothyroidism ☐
- 3) 'sick euthyroid' syndrome ☐
- 4) Spontaneous hypothyroidism ☐
- 5) TSH secreting pituitary adenoma ☐

The results show normal T4, low T3 with elevated TSH. These results are typical of amiodarone induced hypothyroidism which inhibits the peripheral conversion of T4 to T3.

40- 56 year old male with left ventricular systolic dysfunction was dyspnoeic on climbing stairs but not at rest. The patient was commenced on ramipril and frusemide.

Which one of the following drugs would improve the patient's prognosis?

- 1) Amiodarone ☐
- 2) Amlodipine ☐

- 3) Bisoprolol ☐
- 4) Digoxin ☐
- 5) Nitrate therapy ☐

This patient has NYHA stage II heart failure. Studies such as CIBIS-II and MERIT-HF reveal that beta-blockers significantly reduce morbidity and mortality in heart failure.

41- A 60-year-old man with a past history of controlled hypertension presents with acute onset weakness of his left arm, that resolved over 12 hours. He had suffered two similar episodes over the last three months. Examination reveals a blood pressure of 132/82 mmHg and he is in atrial fibrillation with a ventricular rate of 85 per minute. CT brain scan is normal.

What is the most appropriate management?

- 1) amiodarone ☐
- 2) aspirin ☐
- 3) digoxin ☐
- 4) dipyridamole ☐
- 5) warfarin ☐

This patient has had three transient ischaemic attacks due to atrial fibrillation. The most appropriate therapeutic strategy for this patient would be warfarin. Studies reveal that warfarin would be therapeutically superior than aspirin in such a patient's case.

42- A 45 year old female presents with a 6 month history of exertional dyspnoea and is diagnosed with pulmonary fibrosis. Over the last one year she has received a variety of medications. Which of the following drugs could be responsible?

- 1) Dexamethasone ☐
- 2) Ibuprofen ☐
- 3) nalidixic acid ☐
- 4) penicillamine ☐
- 5) sulphasalazine ☐

Sulphasalazine as well as other rheumatology drugs such as Gold, Methotrexate can cause pulmonary fibrosis. Bleomycin and Cyclophosphamide rather than vincristine may be responsible. Corticosteroids are sometimes given as a trial in pulmonary fibrosis. Nalidixic acid is associated with seizures and visual disturbances. However nitrofurantoin is well recognised to cause PF.

Other drugs include amiodarone and nitrofurantoin

43- Which statement is true regarding Gabapentin?

- 1) is a potent hepatic enzyme inducer ☐
- 2) side effects typically include visual field defects with long-term use ☐
- 3) therapy is best monitored through measuring plasma concentrations ☐
- 4) is of particular value as monotherapy in absence attacks (petit mal) ☐

5) requires dose adjustment in renal disease ☐

Gabapentin does not induce cytochrome P450 unlike other anticonvulsants such as phenytoin and phenobarbitone. Vigabatrin may cause visual field defects, which may be irreversible. Rarely have visual disturbances been associated with gabapentin. No use in Petit Mal and is used for add-on therapy in partial or generalised seizures.

44- Which of the following relate to Dopa-decarboxylase inhibitors?

- 1) enhance the effect of levodopa on the substantia nigra ☐
- 2) reduce the extracerebral complications of L-dopa therapy ☐
- 3) have anticholinergic activity ☐
- 4) should not be given in combination with dopamine agonists ☐
- 5) prevent L-dopa associated dyskinesias ☐

A – Dopa-decarboxylase inhibitors prevent the systemic metabolism of levodopa which leads to higher CNS levels. The effect itself is not enhanced only the concentration of available levodopa. B – these include nausea, vomiting, postural hypotension and cardiac arrhythmias. D – the combination makes dyskinetic movements more likely E - No. Dyskinesias are a CNS effect of levodopa.

45- The antibiotic combination Quinipristin and Dalfopristin are

- 1) effective against resistant mycobacterium TB. ☐
- 2) indicated in subjects with chronic renal impairment. ☐
- 3) particularly effective in the treatment of pseudomonas infection in Cystic fibrosis. ☐
- 4) administered orally. ☐
- 5) Effective against multi-resistant Staph Aureus ☐

Quinipristin and Dalfopristin are a synergistic combination of a streptogramin A and B respectively. They are effective against Gram positive aerobes and are particularly useful against resistant strep pneumoniae and Staph Aureus. They can only be administered via a central line.

46- A 60-year-old Chinese man has been started on quinine for leg cramps by his General Practitioner. He presents, a week later, with 5 days of darkened urine and 2 days of increasing breathlessness, back pain and fatigue. Investigations show a haemoglobin of 7.0 g/dl and raised reticulocyte count. Which of the following best explain this drug reaction?

- 1) autoimmune haemolytic anaemia ☐
- 2) glucose-6-phosphate dehydrogenase deficiency ☐
- 3) hereditary spherocytosis ☐
- 4) pyruvate kinase deficiency ☐
- 5) sickle cell disease ☐

G6PDH (X-linked recessive) is seen in African, Mediterranean, Iraqi Jew, South East Asian and Chinese people and predisposes to a haemolytic anaemia reaction with

drugs or infection. Implicated drugs include - aspirin, sulphonamides, antimalarials, and quinidine. The haemolytic anaemia is non-immune (DAT -ve). Pyruvate Kinase Deficiency is autosomal recessive and presents as a chronic haemolytic anaemia exacerbated by viral infections. Hereditary spherocytosis is characterised by variable chronic non-immune haemolysis exacerbated by infections.

47- An 18-year-old woman is admitted after taking drugs at a night-club. Which of the following features suggest she had taken Ecstasy (MDMA)?

- 1) A pyrexia of 40°C ☐
- 2) hypernatraemia ☐
- 3) hypokalaemia ☐
- 4) metabolic acidosis ☐
- 5) respiratory depression ☐

Hyponatraemia, tachycardia, hyperventilation and hyperthermia are features of the amphetamine MDMA abuse.

48- A 65-year-old was advised to start oral digoxin at a dose of 250 µg daily. His physician explained that the full effect of this treatment would not be apparent for at least a week.

Which one of the following pharmacokinetic variables did the physician use to give this explanation?

- 1) bioavailability ☐
- 2) half-life ☐
- 3) plasma protein binding ☐
- 4) renal clearance ☐
- 5) volume of distribution ☐

Digoxin follows first order kinetics and has a half life of 1.6 days in a patient with normal renal function. 65% of the drug absorbed remain in the system after one day. Subsequent doses gradually accumulate until a steady state is achieved after 4 to 5 days.

49- A 70-year-old male is referred by his GP for management of recently diagnosed congestive heart failure. The patient has a history of poorly controlled hypertension. Over the last three months he has been aware of deteriorating shortness of breath, fatigue, and orthopnea. Over the last month he had been commenced on Digoxin (62.5 micrograms daily), Frusemide (80 mg daily), and amiloride 10 mg.

On examination he has a pulse of 96 bpm regular, a blood pressure of 132/88 mmHg. His JVP was not raised, he had some scattered bibasal crackles on auscultation with a displaced apex beat in the anterior axillary line, 6th intercostal space. Auscultation of the heart revealed no murmurs and he had peripheral oedema to the mid tibia.

Investigations showed: electrolytes normal
serum urea concentration 17 mmol/l (NR 2-8 mmol/l)
creatinine 175 micromol/l (NR 55-110)
Serum digoxin 0.7 ng/mL {therapeutic: 1.0-2.0}

One month previously his urea had been 11 mmol/l and creatinine 110 micromol/l. An ECG reveals left ventricular hypertrophy and Chest X-ray shows cardiomegaly and calcified aorta.

What is the most appropriate next step in management?

- 1) Add an ACE inhibitor to the current regimen ☐
- 2) Add atenolol at a dose of 25mg daily ☐
- 3) Increase digoxin to 0.25 mg daily ☐
- 4) Increase frusemide to 80 mg twice daily ☐
- 5) Maintain on current therapy. ☐

This patient would be classified as probably NYHA grade III heart failure (dyspnoeic at rest). With the persisting symptoms despite 80mg of frusemide, guidelines would initially suggest the addition of an ACE inhibitor. Although there has been a mild decline in his U+Es since the introduction of therapy this would not be a contra-indication to the use of ACEis. There is no evidence that increasing a dose of digoxin above 62.5 micrograms in a patient in sinus rhythm would have any added benefit. Although beta-blockers would be of further benefit in this patient, it is important first to establish him on ACEi and then introduce beta-blockers like carvedilol, metoprolol or bisoprolol in a small dose and gradually increase.

50 - A 19 year old female presents with acute breathlessness. She has had asthma for approximately 3 years and recently commenced new therapy. Which agent may be responsible for this exacerbation?

- 1) Salmeterol ☐
- 2) Theophylline ☐
- 3) Beclomethasone ☐
- 4) Ipratropium bromide ☐
- 5) Monteleukast ☐

Salmeterol has been reported to produce an acute exacerbation of asthma, possibly through an acute hypersensitivity reaction.

51- The anticonvulsant Levetiracetam

- 1) Is used as monotherapy for the treatment of generalised convulsions ☐
- 2) Acts via the GABA receptor ☐
- 3) Is associated with induction of hepatic cytochrome p450 enzymes ☐
- 4) Is well absorbed via the oral route ☐
- 5) Is associated with increased plasma concentrations of sodium valproate ☐

Levetiracetam (Keppra) is an adjunctive treatment for partial seizures with or without secondary generalisation. Its mechanism of action is unknown. It is rapidly absorbed orally, it does not effect hepatic enzymes but dose reduction is required in renal failure. The drug appears to be well tolerated with few side effects.

52- A 40-year-old man attending a routing screening has a blood pressure of 166/100 mmHg. Two weeks later his blood pressure was 150/90 mmHg. He does not smoke.

He drinks 35 units alcohol / week. His body mass index (BMI) is 30 kg/m² (20 - 25). What is the best management strategy?

- 1) amlodipine ☐
- 2) atenolol ☐
- 3) bendrofluazide ☐
- 4) enalapril ☐
- 5) lifestyle advice ☐

This 40 year old male has Grade 2 obesity as evidenced by his body mass index (Grade 1 = 25-30 , Grade 2 = 30-40 and Grade 3 = > 40). Hypertension in this individual is most likely due to obesity-related hypertension or due to pseudo-cushings syndrome in view of his high alcohol intake and increased BMI. Heightened sympathetic nervous system activity, hyper-insulinemia, insulin resistance, and hyperleptin-emia contribute to obesity-related hypertension.

He needs lifestyle advice about reducing his alcohol intake and a compatible dietary advice to reduce his weight.

53- Which of the following concerning diamorphine elixir for the relief of pain in terminal patients is correct?

- 1) Analgesia is enhanced if cocaine is added ☐
- 2) Constipation is a characteristic sequel to treatment ☐
- 3) Dependence occurs rapidly ☐
- 4) initial sedation typically continues whilst the drug is administered ☐
- 5) the same amount of pain relief is produced as when the same dose is given via intramuscular injection ☐

Sedation occurring in the first few days typically wears off, leaving the patient alert. Hallucinations also tend to occur. An aperient should always be added to the treatment regime. Addiction is not a problem. An intramuscular injection is three times more effective than the same oral dose (Cornwall Trainers)

54- You are considering starting a patient on Griseofulvin. Which of the following statements concerning its pharmacology is true?

- 1) It is active against Candida albicans. ☐
- 2) It is active against aspergillus. ☐
- 3) It should not be used in renal failure. ☐
- 4) It used for a maximum of 2 weeks. ☐
- 5) It is associated with drug-induced Stevens Johnson syndrome. ☐

For griseofulvin and Steven-Johnson syndrome read J Emerg Med 1984;2:129-135. Many other drugs are implicated in causing Steven-Johnson syndrome.

Griseofulvin is not active against Candida albicans. It is active against trichophytons (tinea) and other dermatophytes. It is metabolised in the liver (note also it's an enzyme inducer). Only 0.1-0.2% excreted in urine. Treatment with griseofulvin is often needed for a long period, sometimes years, depending on the rate of nail growth.

55- A 25 year old man with ankylosing spondylitis develops a DVT after a long haul flight. He is established on warfarin and his indomethacin is discontinued. He has severe spinal inflammation and is unable to cope without a NSAID. Which of the following NSAIDs would be the safest in this case?

- 1) Rofecoxib ☐
- 2) Ibuprofen ☐
- 3) Indomethacin ☐
- 4) Diclofenac ☐
- 5) Naproxen ☐

All NSAIDs should be avoided in patients taking warfarin if at all possible. In patients with severe inflammatory disease this is rarely possible. Rofecoxib is a highly Cox-2-selective NSAID and therefore has no effect on platelet function (platelets only express Cox-1). All the other NSAIDs above have varying degrees of activity against Cox-1 and will therefore affect platelet function and the bleeding time. Cox-2 selective NSAIDs have been shown to be less likely to cause peptic ulcers than traditional NSAIDs. NICE have reviewed this class of drugs and recommend their use in high risk patients (age>65yrs, concomitant medication such as warfarin or steroids, concomitant disease eg diabetes cardiovascular disease and people with a history of peptic ulceration).

56- A 63 year old female presents with dry mouth of 3 months duration. She is taking medication for hypertension, stress incontinence and reflux oesophagitis. Which of the following may be responsible for her dry mouth?

- 1) Oxybutinin ☐
- 2) Doxazosin ☐
- 3) Hydrallazine ☐
- 4) Cimetidine ☐
- 5) Bendrofluazide ☐

Oxybutinin is an effective treatment for detrusor instability and is a parasympathetic muscarinic antagonist. Consequently dry mouth is a problem in up to 70% of cases. Bendrofluazide, the thiazide diuretic, at a dose of 2.5 mg per day is not associated with dry mouth. Cimetidine is a H2 antagonist and is not associated with dry mouth.

57- Hypomagnesaemia may be caused by which of the following drugs?

- 1) Aminophylline ☐
- 2) Cisplatin ☐
- 3) Co-trimoxazole ☐
- 4) Digoxin ☐
- 5) Amitriptyline ☐

Thiazide diuretics (not mentioned here) are a common cause of reduced serum magnesium. Cisplatin is a well recognised cause of hypomagnesaemia.

Toxicology

1- A 19-year-old girl presents with an overdose of Paracetamol. Which of the following statements is correct?

- 1) Acetylcystine should routinely be given if the presentation is within the first 12 hours of overdose. ☐
- 2) Because she is over the age of 6, she is unlikely to develop significant toxicity. ☐
- 3) Liver function tests should be monitored. ☐
- 4) The mortality in those with an AST of >350 IU/L is 4%. ☐
- 5) Hospitalisation will be needed for at least 5 days. ☐

Treatment with N-acetyl cysteine (NAC) is given according to a standard nomogram. NAC may be useful up to 36 hours following ingestion. Children under the age of 6 are unlikely to develop significant toxicity, but adolescents have a higher incidence of toxic plasma levels following ingestion, and a higher incidence of abnormal AST >1000/U/L. Even after serious hepatotoxicity, the mortality rate is under 0.5%. The occasional patient may require liver transplantation.

2- A farmer, on treatment for depression is admitted acutely 1 hour following an intentional overdose of an unidentified substance. On examination he is bradycardic, hypotensive, disorientated, hypersalivating, and has small pupils. He has most likely ingested :

- 1) Paracetamol ☐
- 2) A tricyclic anti-depressant ☐
- 3) Paraquat ☐
- 4) An organophosphate insecticide ☐
- 5) Cyanide ☐

Hypersalivation and miosis are the specific clues to acetylcholine overactivity. Occupational access to organophosphate insecticides. Pupils tend to be dilated with TCA OD. Paracetamol, cyanide, and paraquat shouldn't affect pupils.

3- A 24 year old male presents after developing a bluish discolouration of the body, lips and nails. He denies any relevant past medical history. Examination reveals a central cyanosis and a grey complexion.

Investigation revealed:

Haemoglobin 17.0 g/dL (13.0-18.0)

PaO₂ 13.0 kPa (11.3-12.6)

SaO₂ (using an oximeter) 85% (>95)

What is the most likely diagnosis?

- 1) Argyria ☐
- 2) Cyanotic congenital heart disease ☐
- 3) Haemochromatosis ☐
- 4) Methaemoglobinaemia ☐
- 5) Methylene blue poisoning ☐

This patient is otherwise well and has no specific features of congenital heart disease (clubbing etc). He appears desaturated with sats of 85% yet good pO₂. This is a typical description of methaemoglobinaemia which is the accumulation of reversibly oxidised methaemoglobin causing reduced oxygen affinity of the Hb molecule with consequent cyanosis. It can occur due to an inherited condition or as a consequence of drugs such as nitrites.

Argyria is colloidal silver toxicity. more ...

<http://together.net/~rjstan/rose1.html>

4- A 65-year-old man has longstanding stable heart failure treated with frusemide and enalapril. He complains of swelling in his left knee and his GP treats him with Rofecoxib, a cyclo-oxygenase-2 (COX-2) inhibitor. Two weeks later the patient has increasing breathlessness and ankle oedema.

Which one of the following effects of rofecoxib is the most likely to explain his symptoms?

- 1) decreased absorption of frusemide from the gut ☐
- 2) decreased myocardial contractility ☐
- 3) reduced effective action of enalapril ☐
- 4) the onset of anaemia ☐
- 5) the onset of fluid retention ☐

Rofecoxib acts by inhibiting prostaglandin synthesis via inhibition of cyclooxygenase-2 (COX-2). It causes fluid retention and can worsen an already pre-existing heart failure as in this case. The CSM reminds prescribers that rofecoxib is contraindicated in patients with severe congestive heart failure, active peptic ulceration or GI bleeding.

5- A 75 year old man was admitted after been found collapsed in a garden shed surrounded by a number of empty containers. On clinical examination the patient had small pupils, a heart rate of 50 beats per minute, and was frothing at the mouth. What is the most likely diagnosis?

- 1) Creosote poisoning. ☐
- 2) Glyphosate poisoning. ☐
- 3) Organophosphorus poisoning. ☐
- 4) Paraquat poisoning. ☐
- 5) Pyrethroid poisoning. ☐

The patient has cholinergic features with a relative bradycardia, small pupils and increased salivation. This is highly suggestive of organophosphorus poisoning which as an anticholinesterase inhibitor, thus prolonging the effects of acetylcholine. Paraquat is associated with nausea vomiting and diarrhoea with ulceration. Creosote is a petroleum based substance and would not have such an effect. Glyphosate herbicides produces nausea, vomiting and diarrhoea with a caustic effect in the mouth. Pyrethroid is an insecticide and poisoning is rare but associated with coma, convulsions and pulmonary oedema.

6- An 18-year-old woman is admitted after taking drugs at a night-club. Which of the following features suggest she had taken Ecstasy (MDMA)?

- 1) A pyrexia of 40°C ☐
- 2) hypernatraemia ☐
- 3) hypokalaemia ☐
- 4) metabolic acidosis ☐
- 5) respiratory depression ☐

Hyponatraemia, tachycardia, hyperventilation and hyperthermia are features of the amphetamine MDMA abuse.

7- With regard to poisoning / overdose:

- 1) Phenobarbitone causes a metabolic acidosis ☐
- 2) Ethylene glycol causes a metabolic alkalosis and renal failure ☐
- 3) Aspirin causes acidosis due to hypoventilation ☐
- 4) Methanol causes a metabolic acidosis with an increased anion gap ☐
- 5) Chlormethiazole causes hyperthermia and hypertension ☐

Aspirin causes hyperventilation which may result in a respiratory alkalosis, massive overdose may cause a metabolic acidosis. Phenobarbitone & Chlormethiazole both suppress the CNS causing hypoventilation, hypotension & hypothermia. Ethylene glycol causes a metabolic acidosis. Methanol is metabolised to formaldehyde and formic acid.

8- A 24 year old man presented twelve hours after an overdose of dihydrocodeine 1.2 g and paracetamol 30 g. He had pinpoint pupils, a Glasgow Coma Scale score of 14 and a blood pressure of 100/60 mmHg. Which one of the following is the most appropriate management?

- 1) 500ml of 10% glucose intravenously over four hours. ☐
- 2) Intravenous Flumazenil. ☐
- 3) Intravenous Naloxone. ☐
- 4) Intravenous N-acetylcysteine. ☐
- 5) Oral activated charcoal. ☐

This patient's GCS is reasonable and the opiate-like effects seem minimal (no evidence of respiratory depression). However, this patient has received a hefty dose of paracetamol conferring a high risk of hepatic toxicity. The 12 hour delay makes the absorptive effects of charcoal limited and although it would be useful as gastric emptying may be delayed it is not as important in this patient as the paracetamol antidote. Even though the paracetamol level is not provided, he should be treated with N-acetylcysteine without delay.

9- A 63-year-old man was found collapsed. A Department of Psychiatry outpatient Card was found in his jacket, together with a bottle of procyclidine tablets. He was febrile (38.2°C), conscious but unresponsive to commands. The blood pressure was 160/105 mmHg and there was marked muscle rigidity.

What is the most likely diagnosis?

- 1) acute catatonic schizophrenia ☐
- 2) bacterial meningitis ☐
- 3) cerebral malaria ☐
- 4) neuroleptic malignant syndrome ☐
- 5) procyclidine overdose ☐

The symptoms are typical of neuroleptic malignant syndrome (NMS). NMS is characterized by fever, muscular rigidity, altered mental status, and autonomic dysfunction. Procyclidine is used to treat the Parkinsonian side-effects of neuroleptics: its presence in the patient's pocket implies that he was taking neuroleptics. Signs of procyclidine overdose include agitation, confusion, and sleeplessness lasting up to 24 hours or more. Pupils are dilated and unreactive to light. Visual and auditory hallucinations and tachycardia have also been reported. (Further Reading - Neuroleptic malignant syndrome information service)
http://www.nmsis.org/general_information.shtml

10- An 18-year-old woman is admitted after taking drugs at a night-club. Which of the following features suggest she had taken Ecstasy (MDMA)?

- 1) A pyrexia of 40°C ☐
- 2) hypernatraemia ☐
- 3) hypokalaemia ☐
- 4) metabolic acidosis ☐
- 5) respiratory depression ☐

Hyponatraemia, tachycardia, hyperventilation and hyperthermia are features of the amphetamine MDMA abuse.

11- Lead poisoning:

- 1) Causes hearing loss ☐
- 2) Can only result from lead ingestion ☐
- 3) Is associated with a macrocytic anaemia ☐
- 4) Causes a peripheral neuropathy due to demyelination ☐
- 5) Commonly presents with diarrhoea ☐

Lead can also be absorbed through the skin and by inhalation. Associated with iron deficiency & a microcytic anaemia. Most common GI symptoms are abdominal colic and constipation.

12- Which one of the following is a recognised treatment option in poisoning?

- 1) ethanol for isopropyl alcohol poisoning ☐
 - 2) glucagon for cocaine poisoning ☐
 - 3) methylene blue for cyanide poisoning ☐
 - 4) N-acetylcysteine in paraquat poisoning ☐
 - 5) pralidoxime in sarin (nerve gas) poisoning ☐
-

Sarin is an organophosphorus. Pralidoxime reactivates acetyl cholinesterase enzyme. Should be used in the first few hours.

Ethanol reduces the formation of toxic metabolites produced after ingestion of methanol and ethylene glycol. Glucagon is used in symptomatic beta-blocker overdose. N-acetylcysteine is used in paracetamol overdose. Methylene blue is the antidote for serious methaemoglobinemia.

13- A 49-year-old woman has been an inpatient for the past 10 days for treatment of a bronchopneumonia. She has developed the onset of chills, fever, and skin rash over the past two days. A peripheral blood film reveals eosinophilia. On urinalysis she has ++ proteinuria. There is no past history of renal disease. Her hemoglobin A1C is normal. These findings would most strongly suggest which of the following diagnoses?

- 1) Acute serum sickness ☐
- 2) Acute tubular necrosis ☐
- 3) Drug-induced interstitial nephritis ☐
- 4) IgA nephropathy ☐
- 5) Post-streptococcal glomerulonephritis ☐

The findings are typical of a drug-induced acute interstitial nephritis. Post-streptococcal GN appears weeks after the acute infection. Berger's disease (IgA nephropathy) is characterized by hematuria and often follows a 'flu-like' illness. Eosinophilia is not typical for serum sickness.

14- An adolescent boy presents with unexplained neurological illness. Which one of the following would suggest substance abuse?

- 1) A history of low self-esteem. ☐
- 2) A history of social isolation. ☐
- 3) Deposits around the mouth. ☐
- 4) A history of family conflict. ☐
- 5) A history of attention deficit disorder. ☐

An increasing number of adolescents are experimenting with alcohol, drugs and solvents, usually soon after entering secondary school. Unfortunately, this includes a rising number of young girls smoking. Factors associated with drug use include low self-esteem, social isolation, depression, family conflicts and other conduct disorders. Presentations suggestive of substance abuse include altered behaviour, sniffer's rash, injection sites, chronic upper respiratory tract infection, irregular pulse, glue stains on the skin or clothes, and acute intoxication ± ataxia, coma, respiratory depression and cardiac arrhythmia. The only specific thing indicating substance abuse in this case is, therefore, the deposits presumably of glue around the mouth. Sniffer's rash consists of inflammation and ulceration around the mouth and nose.

15- An 18 year old Asian female is noted to have gingival hypertrophy by her dentist. Which of the following is most likely to be responsible for her presentation?

- 1) carbamazepine ☐
- 2) scurvy ☐

- 3) lead poisoning ☐
- 4) phenytoin ☐
- 5) sodium valproate ☐

The inclusion of 'asian' descent in this question is intended as a distractor. Gum hypertrophy may be seen in conditions such as acute myeloid leukaemias and with drugs such as phenytoin. Scurvy (vitamin C deficiency) is associated with bleeding gums. Lead toxicity is associated with pigmentation of the gingiva. Carbamazepine is not associated with gingival hyperplasia but recognised SEs include ataxia, drowsiness and blood dyscrasias.

16- A 30-year-old man presents to the Accident and Emergency Department with a history of drug overdose. He is known to be repeatedly admitted with similar episodes of self-harm. On this occasion he is drowsy and has prominent hypersalivation.

Which of the following agents, found on his person, is the likely cause?

- 1) Chlormethiazole ☐
- 2) Cocaine ☐
- 3) Dothiepin ☐
- 4) L-dopa ☐
- 5) Solvent cannister ☐

Hypersalivation is seen with parasympathomimetic agents, insecticides, arsenic, strychnine, chlormethiazole and clozapine and others. Solvent abuse may cause an acneiform rash around the buccal cavity. Cocaine abuse leads to hypertension and nasal septum perforation. The other agents are anticholinergic and would cause dry mouth in overdose.

17- A 17 year old girl was found collapsed and drowsy. Her 12-lead ECG showed a sinus tachycardia of 120 beats per minute with a corrected QT interval of 500 ms (normal <470). Which of the following is the most likely cause of her presentation?

- 1) Amphetamine ☐
- 2) Diphenhydramine ☐
- 3) Glue sniffing ☐
- 4) Methadone ☐
- 5) Methanol ☐

Many drugs can cause a prolonged QT interval. more ...

<http://www.ihc.com/xp/ihc/lds/research/specialtopics/longqt.xml>

Average score for this question is 42% (answered 1931 times)

18- A 35-year-old man is admitted following a serious attempt of paracetamol overdose. Despite efforts to treat him he develops liver failure. Which of the following is most likely with the ensuing liver failure?

- 1) It is harmful to give N-acetylcysteine ☐
- 2) better prognosis in those with high alcohol consumption ☐
- 3) hypoglycaemia rarely happens within 12 hours of onset of encephalopathy ☐

- 4) lactic acidosis is recognised complication []
- 5) better prognosis in older patients []

Use of intravenous N-acetylcysteine reduces morbidity and mortality in fulminant hepatic failure. Severe hypoglycaemia affects 40% of patients with fulminant liver failure, which exacerbates encephalopathy. It may develop rapidly and recur with sepsis. Lactic acidosis due to decreased hepatic lactate clearance, compounded by poor peripheral perfusion and increased lactate production. Poor prognosis in those with blood PH<7.0, prolonged prothrombin time (>100s) and serum creatinine >300uM. Mortality is greater if patient > 40 years of age.

Psychiatry

1- In obsessional neurosis:

- 1) patients have good insight [100]
- 2) patients often act on their aggressive impulses [0]
- 3) Low intelligence is a common feature [0]
- 4) the onset is usually after the age of 50 years [0]
- 5) there is often a history of faulty toilet training [0]

Obsessional neurosis is associated with rituals, fears (eg hurting others but never carried out), thoughts abhorrent to the patient and ruminations. The illness is distressing to them and may cause depression. It usually starts in early adult life with equal sex-incidence. The intelligence of these subjects is often above average.

2- A 70-year-old woman presented with episodic impairment of consciousness. Which of the following is the most likely cause?

- 1) Alzheimer type dementia [0]
- 2) chronic sub-dural haematoma [100]
- 3) Creutzfeldt-Jacob disease [0]
- 4) depressive stupor [0]
- 5) normal pressure hydrocephalus [0]

This is quite a grey question. The clinical scenario is very brief with no mention of any neurological signs so a logical deduction must be made.

Alzheimer's disease would be expected to have a continuous impairment of consciousness in its advanced stages but could be episodic if there were variation in drugs therapy or concurrent illnesses. Similarly Normal Pressure Hydrocephalus, Creutzfeld-Jacob and depression would present with dementia (or apparent dementia) but not fluctuant.

Of all those listed subdural haematoma is classically associated with fluctuating level of consciousness. This would make it the most likely.

3- A 21 year old woman is known to suffer from anorexia nervosa. Which of the following metabolic disturbances would be a characteristic finding?

- 1) a decrease in Cortisol levels [0]

- 2) an increase in LH levels [0]
- 3) hyperkalaemia [0]
- 4) impaired glucose tolerance [100]
- 5) raised androgen levels [0]

Malnutrition is another cause of diabetes. (Can you name the others? ... Type 1 and Type 2 OK ... but what about gestational or post pancreatitis / pancreatectomy ... do you know the others? Read more ...).

Cortisol and growth hormone levels are elevated.

LH and FSH would be low and LH response to LHRH is impaired when weight loss is severe.

Hypokalaemia (not hyperkalaemia may be seen). Also there may be hypoalbuminaemia, anaemia, leukopenia, and raised serum carotene.

4- Which of the following is a characteristic feature of transient global amnesia?

- 1) Alkaptonuria [0]
- 2) Cystinuria [0]
- 3) Glycogen storage disease [0]
- 4) Lactose intolerance [0]
- 5) Maple syrup urine disease [100]

MENTAL RETARDATION. Fragile X syndrome-commonest male cause. Hypoxia at birth, intraventricular haemorrhage, rhesus disease, Congenital infections - toxoplasmosis, CMV, rubella, herpes), hypoglycaemia, meningitis, hypothyroidism (cretinism, tuberous sclerosis, Down's, Tay-Sach's, Cornelia De Lange, Hartnup - biochemical, treatable with diet. -homocystinuria, phenylketonuria -maple syrup urine disease, tryptophanuria -galactosaemia

13- Psychiatric illness rather than an organic brain disorder is suggested by:

- 1) Onset for the first time at the age of 55 years [0]
- 2) A family history of major psychiatric illness [100]
- 3) Impaired short term memory [0]
- 4) No previous history of psychiatric illness [0]
- 5) Clouding of consciousness [0]

B is especially associated with depressive illness. The rest all suggest an organic brain disorder.

14- A 22 year old woman complains of haemoptysis, abdominal pains and pyrexia for a month.

She is admitted to hospital and found to be afebrile and not distressed. There are numerous crusted, linear lesions on her forearms.

What is the most likely diagnosis?

- 1) Acute intermittent Porphyria [0]
- 2) Factitious disorder [100]
- 3) Systemic lupus erythematosus [0]

- 4) TB [0]
- 5) Wegener's granulomatosis [0]

The history is very vague and the patient has no clinical features other than a rash which sounds typical of dermatitis artifacta.

15- A 52-year-old male is admitted after taking an overdose.
Which single feature best suggests a high risk of future suicide?

- 1) Making plans before the overdose to avoid discovery [100]
- 2) Ingestion of alcohol with the overdose drug [0]
- 3) Ingestion of more than one drug [0]
- 4) Ingestion of more than 100 tablets [0]
- 5) Previous history of overdose [0]

The effort to conceal the overdose suggests a serious intent to commit suicide.

16- A student is worried that she may not be able to take her final University examinations in three months time because she says she becomes faint and dizzy when she does examinations.

What is the most appropriate course of action?

- 1) Advise her to withdraw from examinations on medical grounds [0]
- 2) 24 hour ECG monitoring [0]
- 3) Arrange counselling, with relaxation training [100]
- 4) Prescribe diazepam [0]
- 5) Prescribe fluoxetine [0]

The symptoms the student describes are characteristic of stress and are quite common. They should be reassured. ECG monitoring would support their fears of organic disease. Diazepam would impair their exam performance and fluoxetine may increase feelings of anxiety.

17- An 18 year old man had repeated episodes of breathlessness and palpitations, lasting about 20 minutes and resolving gradually. There were no abnormal physical signs.

What is the most likely cause of these features?

- 1) Drug abuse [0]
- 2) Panic disorder [100]
- 3) Paroxysmal supraventricular tachycardia [0]
- 4) Personality disorder [0]
- 5) Thyrotoxicosis [0]

Drug abuse is unlikely since their symptoms are quite short lived. We could expect other symptoms such as GI disturbance, headaches or hypertension to accompany a variety of drug abuse causes. Paroxysmal SVT would start and stop suddenly, not

gradually. Personality disorder and thyrotoxicosis would both be expected to lead to symptoms of longer duration with other associated symptoms. This leaves 'panic disorder' as the most likely diagnosis.

18- Which of the following features is characteristic of early Alzheimer's disease?

- 1) ataxic gait [0]
- 2) impaired short term memory [100]
- 3) myoclonic jerks [0]
- 4) urinary incontinence [0]
- 5) visual hallucinations [0]

Alzheimer's disease is characterised early in the disease by short term memory loss. The other features listed here would suggest an alternative diagnosis such as normal pressure hydrocephalus (gait ataxia and urinary incontinence), Creutzfeld-Jacob disease (myoclonic jerks) and delirium or vascular dementia (visual hallucinations).

19- A 17 year old female is referred with a six month history of amenorrhoea and weight loss, for which no organic cause can be found. Which of the following features would support a diagnosis of anorexia nervosa?

- 1) Delusions of poisoning [0]
- 2) Hypotrichosis [0]
- 3) Hypergonadotrophic hypogonadism [0]
- 4) Delusion of being overweight [100]
- 5) Watery diarrhoea [0]

Features of AN include a phobic avoidance of normal weight, relentless dieting, self-induced vomiting, laxative use, excessive exercise, amenorrhoea, lanugo hair, hypotension, denial, concealment, overperception of body image, enmeshed families.

20- Characteristic features of schizophrenia include:

- 1) incongruity of affect [100]
- 2) auditory hallucinations with clouding of consciousness [0]
- 3) memory impairment [0]
- 4) feelings of panic in buses and shops [0]
- 5) grandiose [0]

Incongruity of affect is emotion inappropriate to circumstances. There may be intellectual defects from prolonged institutionization or treatment rather than the illness itself.

21- A 63-year-old man was found collapsed. A Department of Psychiatry outpatient Card was found in his jacket, together with a bottle of procyclidine tablets. He was febrile (38.2°C), conscious but unresponsive to commands. The blood pressure was 160/105 mmHg and there was marked muscle rigidity.

What is the most likely diagnosis?

- 1) acute catatonic schizophrenia [0]
- 2) bacterial meningitis [0]

- 3) cerebral malaria [0]
- 4) neuroleptic malignant syndrome [100]
- 5) procyclidine overdose [0]

The symptoms are typical of neuroleptic malignant syndrome (NMS). NMS is characterized by fever, muscular rigidity, altered mental status, and autonomic dysfunction. Procyclidine is used to treat the Parkinsonian side-effects of neuroleptics: its presence in the patient's pocket implies that he was taking neuroleptics. Signs of procyclidine overdose include agitation, confusion, and sleeplessness lasting up to 24 hours or more. Pupils are dilated and unreactive to light. Visual and auditory hallucinations and tachycardia have also been reported. (Further Reading - Neuroleptic malignant syndrome information service)
http://www.nmsis.org/general_information.shtml

22- Which of the following is true regarding Depersonalisation Syndrome?

- 1) precedes the onset of schizophrenia [0]
- 2) is a feeling that other people have changed [0]
- 3) is associated with depression [100]
- 4) is an indication for Electroconvulsive Therapy (ECT) [0]
- 5) characteristically precedes derealisation [0]

a - depersonalisation is not exclusively seen in schizophrenics b - this is derealisation see below c - Depersonalisation may occur in almost all major psychiatric disorders, drug abuse, migraine, epilepsy, SLE and, transiently, in normal individuals. d - ECT has been tried in the past. SSRI antidepressants and coping strategies are useful. e - derealisation is a separate pathology Depersonalisation is a change in an individuals self-awareness such that they feel detached from their own experience with the self, the body and mind seeming alien. Derealisation is a change in an individuals experience of the environment where the world around them feels unreal and unfamiliar.

23- Regarding puerperal psychosis which of the following statements are true?

- 1) usually begins after the second week of the puerperium [0]
- 2) often takes the form of schizophrenia [0]
- 3) recurrence of puerperal psychosis in subsequent pregnancies is the rule [0]
- 4) the onset is usually insidious [0]
- 5) the prognosis is usually good [100]

Puerperal psychosis is a relatively rare complication of childbirth affecting 1 - 2 per 1000 births. (Postnatal depression is much commoner affecting 100 - 150 women per 1000 births). Puerperal psychosis is a mood disorder with features of loss of contact with reality, hallucinations, thought disorder and abnormal behaviour. It usually presents rapidly in the first month but most often starts in the first week. Prognosis is good.

Read more SIGN guideline 60.

<http://www.sign.ac.uk/pdf/sign60.pdf>

Radiology

1- Cavitation in CXR seen in:

- 1) sarcoidosis [0]
- 2) pneumococcal pneumonia [0]
- 3) Legionnaires' disease [0]
- 4) Klebsiella pneumonia [100]
- 5) viral pneumonia [0]

Cavitating lesion caused by squamous cell carcinoma, abscess (Staph aureus, Klebsiella and Pseudomonas aeruginosa), lymphoma, rheumatoid nodule, pulmonary infarction or Wegener's granulomatosis.

2- Which of the following is a feature of cystinuria?

- 1) accumulation of cystine in the kidney [0]
- 2) a useful response to acidification of urine [0]
- 3) autosomal dominant inheritance [0]
- 4) excessive urinary arginine excretion [100]
- 5) radiolucent urinary calculi [0]

Cystinuria is the commonest inborn error of amino acid transport. Amino acids excreted in urine are cystine, ornithine, arginine and lysine (mnemonic - COAL). The renal stones are radio-opaque due to the presence of sulphur. It is inherited as an autosomal recessive condition. Management includes alkalinization along with high fluid intake (>4 L/day); d-penicillamine may also be used. It is cystinosis that leads to accumulation of cystine in the kidney.

3- Low uptake of ¹²³I on the thyroid uptake scan would be an expected finding in:

- 1) A solitary toxic nodule [0]
- 2) A multi-nodular toxic goitre [0]
- 3) Amiodarone induced thyrotoxicosis type 1 [0]
- 4) DeQuervain's thyroiditis [100]
- 5) Graves' thyrotoxicosis [0]

DeQuervain's thyroiditis is classically associated with low or absent ¹²³I (the ¹³¹ radioactive isotope of iodine) uptake. The others will have high or normal uptake. In particular type 1 amiodarone induced thyrotoxicosis may be distinguished from the thyroiditis of type 2 by the normal or high uptake scan.

4- A 40 year old female is admitted with a suspected pulmonary embolism. A ventilation perfusion scan is requested. Which of the following is true of lung ventilation perfusion scanning in suspected PE?

- 1) A normal perfusion scan virtually excludes pulmonary embolism [100]
- 2) It is contraindicated if the patient is pregnant. [0]
- 3) It is contraindicated in those with iodine hypersensitivity [0]
- 4) There is reduced perfusion in the upper lobes in mitral stenosis. [0]
- 5) The appearances of the scan would resemble those in pulmonary embolism if the patient had emphysema. [0]

Increased pulmonary venous pressure, especially secondary to mitral valve disease causes increased flow to the upper lobes. COPD usually give rise to matched defects. Radiation to fetus is small. VQ scan is not contraindicated in pregnant women, although the perfusion only scan is adequate. Xenon is used for imaging ventilation, whilst technethium labeled macroaggregated human serum albumin (MAA) to image perfusion. A normal perfusion scan has a sensitivity of 98% but a specificity of only 40%.

5- A 24-year-old lady presents with marked loss of vision in her right eye which is subsequently diagnosed as optic neuritis. She has no other history suggestive of demyelination. An MRI scan of her brain is normal. What is the chance of her subsequently developing Multiple Sclerosis?

- 1) 0-20% [100]
- 2) 20-40% [0]
- 3) 40-60% [0]
- 4) 60-80% [0]
- 5) 80-100% [0]

In the Optic Neuritis study group Brain MRI performed at study entry was a strong predictor of CD/MS, with the 5-year risk of CD/MS ranging from 16% in the 202 patients with no MRI lesions to 51% in the 89 patients with three or more MRI lesions. In patients with more than 3 plaques on MRI scan the chance of subsequent MS is increased to about 50%.

6- Which of the following regarding salivary gland pleomorphic adenomas is correct?

- 1) they are the most common salivary gland tumor [100]
- 2) are commoner in the sub-mandibular than the parotid gland [0]
- 3) in the parotid gland most commonly arise medial to the facial nerve [0]
- 4) are more common in males than in females [0]
- 5) Typically enhance following intravenous contrast injection in CT [0]

a-They are the most common salivary gland tumor representing 70% to 80% of all benign salivary gland tumors b-84% occur in parotid gland c-90% of parotid gland pleomorphic adenomas arise lateral to facial nerve d-They occur most often in women over 40 e-Usually they do NOT enhance (Dr Martin Schranz)

7- A 51 year old businessman complains of dyspnoea on exertion. He recently returned from a business trip to the USA. He has distant heart sounds on auscultation of the chest. A chest radiograph reveals that there is a thin rim of calcification surrounding the cardiac outline. Which of the following conditions is most likely responsible for these findings?

- 1) Uraemia [0]
- 2) Tuberculosis [100]
- 3) Group B coxsackie virus [0]
- 4) Sarcoidosis [0]
- 5) Metastatic carcinoma [0]

The most likely diagnosis is a constrictive pericarditis. The most probable cause for this is previous tuberculous infection which may have occurred many years previously. Acute TB would usually cause a constrictive pericarditis secondary to a pericardial effusion, but is not normally associated with calcification. Uraemia can cause a constrictive pericarditis, as can a pericardial malignancy, and coxsackie virus (secondary to a pericarditis) but calcification would be unusual. Sarcoid can cause both pericardial as well as restrictive cardiomyopathy but calcification would be unusual.

8- Progressive Massive Fibrosis (PMF) is most likely to be found in which of the following?

- 1) Complicated silicosis [100]
- 2) Extrinsic allergic alveolitis [0]
- 3) Lobar pneumonia [0]
- 4) Sarcoidosis [0]
- 5) Simple coal workers pneumoconiosis [0]

Progressive Massive Fibrosis is diagnosed by Chest X-Ray as round masses, several centimetres in diameter usually in the upper lobes. They may have necrotic centres. In silicosis a more accurate term is 'conglomerate nodules'.

9- A 65-year-old man, with a history of smoking, presents with chronic cough, haemoptysis and weight loss. His Chest X-Ray shows a cavitating lesion. What is the likely diagnosis?

- 1) adenocarcinoma [0]
- 2) alveolar cell carcinoma [0]
- 3) large cell carcinoma [0]
- 4) small cell carcinoma [0]
- 5) squamous cell carcinoma [100]

Squamous cell carcinomas characteristically present with cavitating lung lesions on Chest X-Ray and metastasize late. Other causes of cavitating lung lesions include infection (Staphylococcus aureus, tuberculosis, Klebsiella, Pneumocystis carinii), pulmonary infarcts, Wegener's Granulomatosis and Rheumatoid nodules.

Respiratory

1- The following are recognized features of Pancoast's tumour except:

- 1) ipsilateral Horner's syndrome [0]
 - 2) wasting of the dorsal interossei [0]
 - 3) pain in the arm radiating to the fourth and fifth fingers [0]
 - 4) erosion of the first rib [0]
 - 5) weakness of abduction at the shoulder [100]
-

The tumour causes pain in the C8 and T1 distribution and Horner's syndrome. It may cause small muscle wasting of the hands and erosion of 1st rib. The nerve root for abduction of shoulder is C5.

2- Which of the following is true concerning Whooping cough (pertussis)?

- 1) is a greater threat to children during the second 6 months of life, after maternal antibody has declined, than during the first 6 months [0]
- 2) may lead to hemiplegia [100]
- 3) is characteristically associated with a polymorph leucocytosis [0]
- 4) is associated with convulsions less frequently than is the case with other febrile conditions [0]
- 5) rapidly resolves with antibiotic treatment [0]

Whooping cough (pertussis) is caused by the bacterium *Bordetella pertussis*. *B. pertussis* is a very small Gram-negative aerobic coccobacillus that appears singly or in pairs. Infection is characterised by paroxysms of coughing. Lymphocytosis is typically found. Hemiplegia is a recognised effect of severe whooping cough. The pertussis vaccine is estimated to be 63% to 94% effective in the DPT shot.

3- A 19-year-old female developed pleural effusions, ascites and ankle swelling. Her blood pressure was 112/76 mmHg.

Investigations revealed:

serum alanine transferase 17 U/L (5 - 15)
serum total bilirubin 17 $\mu\text{mol/L}$ (1 - 22)
serum albumin 21 g/L (34 - 94)
serum total cholesterol 9.8 mmol/L (<5.2)

What is the next most appropriate investigation?

- 1) Antinuclear antibody [0]
- 2) Pregnancy test [0]
- 3) Prothrombin time [0]
- 4) Serum protein electrophoresis [0]
- 5) Urinary protein estimation [100]

The low albumin and elevated cholesterol would suggest nephrotic syndrome (>4gram protein/24hour urine). Other complications of nephritic syndrome include susceptibility to infection, thromboses, renal failure and protein malnutrition. The normal BP makes preeclampsia unlikely. Besides, the hypercholesterolaemia is the big clue.

4- A 51 year old businessman complains of dyspnoea on exertion. He recently returned from a business trip to the USA. He has distant heart sounds on auscultation of the chest. A chest radiograph reveals that there is a thin rim of calcification surrounding the cardiac outline. Which of the following conditions is most likely responsible for these findings?

- 1) Uraemia [0]
- 2) Tuberculosis [100]

- 3) Group B coxsackie virus [0]
- 4) Sarcoidosis [0]
- 5) Metastatic carcinoma [0]

The most likely diagnosis is a constrictive pericarditis. The most probable cause for this is previous tuberculous infection which may have occurred many years previously. Acute TB would usually cause a constrictive pericarditis secondary to a pericardial effusion, but is not normally associated with calcification. Uraemia can cause a constrictive pericarditis, as can a pericardial malignancy, and coxsackie virus (secondary to a pericarditis) but calcification would be unusual. Sarcoid can cause both pericardial as well as restrictive cardiomyopathy but calcification would be unusual.

5- A 48-year-old woman presented with shortness of breath, cough with heavy sputum production, and a low grade fever. She has smoked 20 cigarettes per day for 30 years. Her arterial blood gases revealed pH of 7.4, PaCO₂ of 45 and a PaO₂ of 78.

What is the most likely diagnosis?

- 1) Bronchial asthma [0]
- 2) Chronic bronchitis [100]
- 3) Cryptogenic fibrosing alveolitis [0]
- 4) Paraneoplastic syndrome [0]
- 5) Pulmonary embolism [0]

6- A 49-year-old man with a long history of alcoholism presents with cough, haemoptysis and pleuritic chest pain. He has had night sweats and 10 kg weight loss in the last three months. On chest X-ray there is a subtle nodular pattern throughout the lung.

He underwent a transbronchial biopsy which showed multinucleated giant cells, epithelioid cells and necrotic debris.

Which of the following is the most likely diagnosis?

- 1) Aspergillosis [0]
- 2) Pneumocystis carinii pneumonia [0]
- 3) Small cell carcinoma [0]
- 4) Squamous cell carcinoma [0]
- 5) Tuberculosis [100]

7- A 55 year old man who has a 25 year pack history of smoking presents with productive cough with mucoid sputum of 2 year duration. On examination he has scattered ronchi and wheezing. The likeliest diagnosis is :

- 1) Bronchial Asthma [0]
- 2) Bronchiectasis [0]
- 3) Chronic Bronchitis [100]
- 4) Pneumonitis [0]
- 5) Fibrosing Alveolitis [0]

Chronic bronchitis is one of the most common respiratory diseases due to cigarette smoking. The smoking history and productive cough for at least 2 years is indicative of chronic bronchitis.

8- A 67 year old who is known to suffer from severe chronic bronchitis is admitted from home with an acute exacerbation. Which of the following is true?

- 1) An Acidosis with a low bicarbonate would be expected [0]
- 2) Extensor plantar responses feature [100]
- 3) Gentamicin would be a reasonable initial treatment until cultures are available [0]
- 4) Oxygen therapy should aim to increase the pO₂ to above 8kPa (60mmHg) [0]
- 5) Peripheral oedema indicates coexisting heart failure [0]

In chronic bronchitis, a low pO₂ with high pCO₂ and compensated respiratory acidosis with high bicarbonate is expected. The figures given suggest a metabolic acidosis.

BTS guidelines would recommend treatment of exacerbations with amoxycillin or cephalosporin

Oxygen therapy should be given cautiously aiming to maintain a pCO₂ between 50-60mmHg (see Harrisons - Principles of Internal Medicine), this is debateable but the point is that the aim should not be a normal pO₂ but rather a sufficient pO₂ particularly in 'blue bloaters' (type II respiratory failure). Extensor plantar responses are a feature often reflecting high pCO₂

There may be a dependent (postural) oedema and does not necessarily indicate heart failure.

9- A 65-year-old woman, has smoked 50 cigarettes a day for 40 years. She has had increasing dyspnoea for the several years, but no cough. A Chest X-ray shows increased lung size along with flattening of the diaphragms, consistent with emphysema. Over the next several years she develops worsening peripheral oedema. Her vital signs show T° 36.7 C, P 80, RR 15, and BP 120/80 mm Hg. Which of the following cardiac findings is most likely to be present?

- 1) Mitral valve stenosis [0]
- 2) Constrictive pericarditis [0]
- 3) Right ventricular hypertrophy [100]
- 4) Left ventricular aneurysm [0]
- 5) Non-bacterial thrombotic endocarditis [0]

The most likely finding in this woman is pulmonary hypertension as a result of emphysema secondary to long term cigarette smoking. Peripheral oedema is due to right heart dilatation and failure. Mitral stenosis is not supported by the history. Constrictive pericarditis could be caused by a lung malignancy in this patient, but again, there is no suggestion of this in the history. Constrictive pericarditis would be characterised by soft heart sounds, a diastolic "pericardial knock", and gross signs of right heart failure. LV aneurysm would lead to symptoms and signs of left heart failure and again is not the most likely finding suggested by the history.

10 -In which of the following cases of lung cancer would surgical resection of the tumour be a reasonable therapeutic option?

- 1) A 56-year-old woman with an adenocarcinoma of the right lung. CT scan shows enlarged lymph nodes in the right and left hilum. PFTs show an FEV1 of 2.25 L. (55% predicted). [0]
- 2) A 59-year-old man who is found at bronchoscopy to have a tumour in the right mainstem bronchus extending to within 1 cm of the carina. Pulmonary Function Tests (PFTs) show an FEV1 of 2.1 liters (65% of predicted normal). [0]
- 3) A 62-year-old lady with a small peripheral mass who has elevated liver enzymes and a computed tomography (CT) scan showing probable metastatic deposits in the liver PFTs show an FEV1 of 3.5 Liters (80% of predicted normal). [0]
- 4) A 70-year-old man with a right lower lobe tumour 2 cm in diameter with no evidence of regional adenopathy or distant spread of disease. PFTs show an FEV1 of 0.8 Liters (28% predicted). [0]
- 5) A 71-year-old man with a 3 cm tumor obstructing the right lower lobe bronchus. PFTs show an FEV1 of 1.98 L. (43% predicted). [100]

11- A 20-year-old male student is assessed for shortness of breath that occurs whilst running. He has no other symptoms and does not smoke. Examination, full blood count, and chest X-ray are normal. Which of the following is most likely to be helpful in confirming the suspected diagnosis?

- 1) Arterial blood gas studies before and after exercise [0]
- 2) Determination of lung volumes and diffusing capacity [0]
- 3) Measurement of venous blood lactate before and after exercise [0]
- 4) Spirometry before and after administration of bronchodilators [0]
- 5) Spirometry before and after exercise [100]

The most likely diagnosis is exercise induced asthma and this would be best diagnosed with spirometry before and after exercise where a typical obstructive pattern may be displayed following exercise. No abnormalities may be displayed following bronchodilator therapy if true exercise induced asthma. Similarly lung volumes and diffusion capacity are likely to be unaffected. Blood gas analysis would be relatively unhelpful in this scenario as little change in partial pressures would be expected. This patient does not have a glycogen storage disease where weakness rather than shortness of breath is more typical. Hence lactate measurements are unnecessary.

12- A 40-year-old worker presents with wheezing and breathlessness which seem to improve over weekends and holiday periods when he is not working. What is he most likely to be exposed to at work?

- 1) Platinum salts [100]
- 2) Avian bloom [0]
- 3) *Aspergillus clavatus* [0]
- 4) Work in the Silver industry [0]
- 5) Exposure to spores of *Actinomyces* [0]

Disinfectants and preservatives including glutaraldehyde, chlorhexidine and formaldehyde can cause occupational asthma. Metals causing occupational asthma include isocyanates cobalt, aluminium, chrome, manganese, nickel, zinc, and platinum. Exposure to *Actinomyces* (farmer's lung, mushroom workers' lung), avian

bloom (bird fanciers' lung) and aspergillus clavatus (malt worker's lung) cause extrinsic allergic alveolitis.

13- The pulmonary vascular system is different from the systemic circulation in that the pulmonary system demonstrates which of the following?

- 1) High pressures, high flow rates, highly compliant vessels [0]
- 2) High pressures, high flow rates, low compliance vessels [0]
- 3) Low pressures, high flow rates, high compliance vessels [0]
- 4) Low pressures, low flow rates, high compliance vessels [100]
- 5) Low pressures, low flow rates, low compliance vessels [0]

14- A 60 year old man with ankylosing spondylitis presents with cough, weight loss and tiredness. His CXR shows longstanding upper lobe fibrosis. Three sputum tests stain positive for Acid fast bacilli but are consistently negative for Mycobacterium tuberculosis on culture. Which of the following is the most likely cause?

- 1) Mycobacterium avium intracellulare complex [100]
- 2) Micropolyspora faeni [0]
- 3) Allergic Bronchopulmonary Aspergillosis [0]
- 4) Sarcoidosis [0]
- 5) Tuberculosis [0]

The presence of AFB yet absence of TB suggests an atypical AFB such as M. avium.

15- Which of the following is a recognised cause of a phrenic nerve palsy?

- 1) Aortic aneurysm [100]
- 2) Dermoid [0]
- 3) Ganglioneuroma [0]
- 4) Pericardial cyst [0]
- 5) Sarcoidosis [0]

The diaphragm is innervated by the phrenic nerve (C3,4,5). Palsy is a recognised complication of thoracic surgery, infection, Guillain-Barre or invasion by an adjacent tumour. It may also be stretched by an aortic aneurysm.

16- Which of the following statements is true of the pulmonary function test's vital capacity (VC)?

- 1) Vital capacity cannot be measured from spirometry alone [0]
- 2) Vital capacity is increased in emphysema and reduced in interstitial fibrosis [0]
- 3) Vital capacity is the maximal amount of air which can be exhaled after maximal inspiration [100]
- 4) Vital capacity is the sum of tidal volume (VT) and inspiratory capacity (IC) [0]
- 5) Vital capacity, when reduced, is a specific indication of restrictive lung disease [0]

17- A 24 year old asthmatic female is admitted with acute severe asthma. Which of the following statements regarding the diagnosis is correct?

- 1) Agitation should be managed with a benzodiazepine [0]
- 2) A high inspired Oxygen concentration should be used routinely [100]
- 3) Inhaled salmeterol is indicated as first line therapy [0]
- 4) Normal arterial pCO₂ is reassuring [0]
- 5) Pulsus paradoxus is a reliable sign of severity [0]

A normal or raised arterial pCO₂ is an indication of severe asthma. Pulsus paradoxus is not reliable and is not part of the criteria in assessing severity of asthma attack. Salmeterol is used in management of chronic asthma (Step 3). High dose oxygen (40-60%) should be used in severe asthma attack, together with steroids and nebulised bronchodilators. Sedation must be avoided as it can cause respiratory failure and arrest.

18- Recognised associations. Which of the following is correct?

- 1) pneumoconiosis and clubbing [0]
- 2) lung carcinoids and pleural effusion [0]
- 3) pulmonary embolus and left bundle branch block [0]
- 4) pulmonary fibrosis and hypercapnia [0]
- 5) bronchopulmonary aspergillosis and wheezing [100]

Pulmonary fibrosis associated with type 1 respiratory failure, which is associated with ventilation/perfusion mismatch. Allergic bronchopulmonary aspergillosis caused by *Aspergillus fumigatus*, which can present with asthma and eosinophilia.

19- dry cough. Her chest X-ray shows an area of dense pneumonia-like consolidation in the right lower lobe. A course of antibiotics did not improve her symptoms or chest X-ray. Bronchioalveolar lavage (BAL) retrieved 'atypical' cells. What is the most likely diagnosis?

- 1) Bronchioloalveolar cell carcinoma [100]
- 2) *Mycoplasma pneumoniae* [0]
- 3) Pulmonary alveolar proteinosis [0]
- 4) Pulmonary embolism with infarction [0]
- 5) Sarcoidosis [0]

"Bronchoalveolar carcinoma accounts for between 1-20% of pulmonary neoplasms. The population most affected is middle-aged, with no predilection for either sex. Interestingly, there is an increased incidence in patients with scleroderma or other diseases causing localized parenchymal scarring or diffuse interstitial fibrosis. Diffuse bilateral involvement in bronchoalveolar cell carcinoma occurs late in the disease and is usually spread by the bronchial tree. Manifestations include both local and diffuse forms. The local form may grow very slowly changing little for several years. The diffuse form simulates an airspace filling disease with air bronchograms and air bronchulograms. A pleural effusion develops in 8-10% of cases." More ...

<http://gamma.wustl.edu/pt005te163.html>

20- Randomised controlled trials have shown that long-term oxygen therapy (LTOT) reduces mortality in:

- 1) cryptogenic fibrosing alveolitis [0]
- 2) cor pulmonale due to chronic airflow obstruction [100]
- 3) asthma [0]
- 4) cystic fibrosis [0]
- 5) pulmonary sarcoidosis [0]

Adequate data for LTOT prolonging survival exists only for COPD although in practice it is assumed to apply in other chronic hypoxaemic lung conditions.

21- A 65-year-old woman, a heavy smoker for many years, has had worsening dyspnoea for the past 5 years, without a significant cough. A chest X-ray shows increased lung size along with flattening of the diaphragms, consistent with emphysema. Over the next several years she develops worsening peripheral oedema. BP 115/70 mmHg. Which of the following cardiac findings is most likely to be present?

- 1) Constrictive pericarditis [0]
- 2) Left ventricular aneurysm [0]
- 3) Mitral valve stenosis [0]
- 4) Non-bacterial thrombotic endocarditis [0]
- 5) Right ventricular hypertrophy [100]

This lady has Chronic Obstructive Airways disease and subsequent Cor Pulmonale leading to right heart failure. Non-bacterial thrombotic endocarditis is a condition seen in frail ill individuals.

22- A 45-year-old solicitor had an onset of severe, crushing, substernal chest pain while attending a football match. He collapsed on his way to the car. Bystander Cardiorespiratory Resuscitation was begun immediately and continued until arrival in Casualty where an endotracheal tube was inserted and ventilation was maintained on 100% oxygen.

Investigations revealed:

pH 7.13
PaO₂ 560 mmHg
PaCO₂ 18 mmHg
Bicarbonate 5.8
SaO₂ 98%

Based on these laboratory values, which of the following statements best describes his current pathophysiology?

- 1) He is demonstrating a primary respiratory alkalosis [0]
- 2) He probably developed a large right to left intracardiac shunt [0]
- 3) His anion gap is probably normal [0]
- 4) His oxyhemoglobin curve is shifted to the left [0]
- 5) His pulmonary artery pressure is probably elevated [100]

This young patient with severe central chest pain has probably arrested due to myocardial infarction and arrhythmia. His gases reveal high PO₂ following 100% O₂ but severe acidosis due to the arrest and lactic acidosis thus anion gap would be high. He does not have a primary ventilatory failure as his PO₂ is high. There is no left to right shunting and high pulmonary pressures would be expected after this arrest scenario.

23- Obstructive sleep apnoea characteristically associated with:

- 1) hypersomnolence [100]
- 2) impotence [0]
- 3) macrognathia [0]
- 4) insomnia [0]
- 5) polydipsia [0]

Dominant symptom = hypersomnolence (sleepiness). Other most common symptoms include apparent personality changes, witnessed apnoeas and true nocturnal polyuria. Reduced libido is less common. Sleep apnoea may be associated with acromegaly, myxoedema, obesity and micrognathia/retrognathia.

24- A 26-year-old man with a history of alcohol and drug abuse was admitted with a 14 day history of fever, cough and fatigue. He was emaciated. His temperature was 39.4°C. Cervical and axillary lymphadenopathy were present. Chest X-ray revealed bilateral areas of pulmonary shadowing. Which of the following is the most likely diagnosis?

- 1) alcoholic cardiomyopathy [0]
- 2) pneumococcal pneumonia [0]
- 3) pneumocystis pneumonia [100]
- 4) pulmonary tuberculosis [0]
- 5) tricuspid endocarditis [0]

Pneumocystis carinii is the most common opportunistic infection in AIDS. This patient is at risk of HIV with the history of drug abuse. Persistent generalised lymphadenopathy may develop in HIV before the patient fulfils the criteria of AIDS. As the disease progress, there is atrophy of the lymph nodes. Less likely is pulmonary tuberculosis which can also cause any abnormality on CXR, and involve peripheral lymph nodes. The others are unlikely to cause lymphadenopathy.

25- A 75-year-old man with squamous cell carcinoma is thought to have resectable disease. Which of the following would be a contraindication to surgery?

- 1) clubbing [0]
 - 2) FEV₁ of 0.75 L [100]
 - 3) his age of 75 years [0]
 - 4) pleural effusion [25]
 - 5) Syndrome of Inappropriate ADH [0]
-

Contraindications to surgery are proven metastases, mediastinal organ involvement, malignant pleural effusion (i.e. straw coloured, reactive effusions are not a contraindication if cytology is negative), contralateral mediastinal node involvement, FEV1 < 0.8 L, severe cardiac or other significant disease (e.g. cerebrovascular, renal, liver etc.).

26- A 36 year old woman presents with dyspnoea, cough and fever. Crackles are heard on auscultation of the lungs. Circulating precipitans to *Micropolyspora faeni* are positive. Which of the following is the most likely diagnosis?

- 1) Malt workers' lung [0]
- 2) Pigeon fanciers' lung [0]
- 3) Allergic Bronchopulmonary Aspergillosis [0]
- 4) Brucellosis [0]
- 5) Farmers' lung [100]

Spores of *Micropolyspora faeni* found in moldy hay/straw are responsible for Farmer's Lung.

27- A 41 year old man with a history of nasal congestion, breathlessness, cough and wheeze presents with a left foot drop. Which of the following is the most likely diagnosis?

- 1) Diabetes mellitus [0]
- 2) Wegeners Granulomatosis [0]
- 3) Churg Staus Syndrome [100]
- 4) Pulmonary eosinophilia [0]
- 5) Polyarteritis Nodosa [0]

Churg Strauss syndrome is an eosinophilic vasculitis involving small and medium sized arteries and veins. It has three progressive phases; the first prodromal phase is of asthma and rhinitis, the second of tissue and peripheral blood eosinophilia and the final phase of systemic vasculitis. Asthma may precede the onset of vasculitis by many years although all three phases can occur together. Peripheral nervous system involvement usually takes the form of a mononeuritis multiplex or a mixed sensory and motor polyneuritis.

28- In asbestos related disorders which of the following statements is correct?

- 1) basal fibrotic shadowing on CXR suggests coincidental idiopathic fibrosing alveolitis [0]
- 2) increased incidence of primary lung cancer [100]
- 3) pleural effusion develops more than 20 years after causative asbestos exposure [0]
- 4) pleural plaques are recognized precursors of mesothelioma [0]
- 5) the risk of malignant mesothelioma is greatly increased in smokers compared with non-smokers [0]

The risk of mesothelioma is not affected by smoking but smoking and asbestos exposure greatly increases the risk of lung cancer. It is pleural plaques which do not become apparent until 20 years or more after exposure. Pleural effusions may result

from acute asbestos pleurisy. Pleural plaques are not precursors of malignant change, but they reflect previous asbestos exposure. Basal fibrotic changes suggest the presence of asbestosis as the fibres are fibrogenic.

29- A 60 year old man was admitted with community-acquired pneumonia and deteriorated over the next few hours.

Which one of the following indicates a poor prognosis?

- 1) A total white cell count of $17 \times 10^9/L$ (4-11) [0]
- 2) Blood pressure of 110/70 mm Hg [0]
- 3) Respiratory rate of 35 breaths/min [100]
- 4) Rigors [0]
- 5) Temperature of $39^{\circ}C$ [0]

The presence of raised urea ($>7\text{mM}$), hypotension (diastolic BP equal or $<60\text{mmHg}$) and respiratory rate equal or $>30/\text{min}$ is associated with significantly increased risk of death. Other less important features of severe pneumonia include older age (>60), comorbidity, confusion, cyanosis, $WBC <4000$ or >30000 , hypoxia and CXR with multilobe involvement.

30- Which of the following statements concerning industrial lung disorders is correct?

- 1) pneumoconiosis can be diagnosed in the absence of chest X-ray abnormalities [0]
- 2) occupational asthma occurs more frequently in atopic persons [100]
- 3) silo fillers disease is caused by allergy to grain [0]
- 4) widespread crepitations are typically heard in extrinsic allergic alveolitis [0]
- 5) symptoms occur within minutes if exposure to mouldy hay in Farmer's lung [0]

a-Pneumoconiosis is an X-Ray diagnosis. It is due to deposition of coal dust in parenchyma and reaction to its presence. The types - simple / complicated - are diagnosed on XRay appearance b-It also occurs more frequently in smokers. c-Silo fillers' disease is pulmonary oedema caused by inhalation of oxides of nitrogen generated by fresh silage. d - crepitations are not usually widespread but tend to be basal in location. e-Symptoms usually occur within hours.

31- A young child presents with respiratory distress, worsening over 2 days. Blood gases show a pH of 7.25, a PCO_2 of 7.5kPa , a PO_2 of 8.5kPa , and a base excess of -4. Which of the following interpretations is correct?

- 1) Results are consistent with bronchopulmonary dysplasia. [0]
- 2) Blood gases suggest type 1 respiratory failure. [0]
- 3) Immediate intubation is required. [0]
- 4) Results are consistent with late severe asthma. [100]
- 5) Bicarbonate may be necessary to correct the acidosis. [0]

In interpreting blood gas results, the following sequence may be useful:

Inspect the pH: Is it low, normal or high?

Inspect the CO_2 : Is it low, normal or high?

Inspect the PO_2 : Is it low, normal or high?

If the pH is low then an acidosis is present, and inspecting the CO₂ will enable you to determine whether this is due to respiratory or metabolic causes. Inspecting the PO₂ will tell you whether the child is hypoxic or not. In this case, the pH is reduced, and the CO₂ is high, with a base deficit of only -4, insufficient to explain the acidosis from metabolic causes. This is, therefore, a respiratory acidosis, and the PO₂ is also a little low suggesting type 2 respiratory failure. Possible causes would include pneumonia, early hyaline membrane disease, ARDS. In asthma, the initial stages show a low CO₂, with this climbing only as a pre-terminal event. The results would therefore be consistent with late severe asthma. In bronchopulmonary dysplasia, there is usually long-term CO₂ retention with compensatory increase in bicarbonate leading to a positive base excess and normal pH. Bicarbonate is usually only considered if the base deficit exceeds about -8 or 00.

32- A 19 year old female presents with acute breathlessness. She has had asthma for approximately 3 years and recently commenced new therapy. Which agent may be responsible for this exacerbation?

- 1) Salmeterol [100]
- 2) Theophylline [0]
- 3) Beclomethasone [0]
- 4) Ipratropium bromide [0]
- 5) Monteleukast [0]

Salmeterol has been reported to produce an acute exacerbation of asthma, possibly through an acute hypersensitivity reaction.

33- A 22 year old lady recently returned from a holiday in Malta was admitted with a 3 day history of fever, generalised lymphadenopathy and a macular rash over the trunk and legs. Which of the following is the most likely diagnosis.

- 1) Sarcoidosis [0]
- 2) Tuberculosis [0]
- 3) Familial Mediterranean Fever [0]
- 4) Infectious Mononucleosis [100]
- 5) Actinomycosis [0]

Infectious Mononucleosis occurs most commonly in adolescents and young adults. Clinical features occur after a 2-5 week incubation period and include fever, malaise, pharyngitis, and lymphadenopathy. Rashes occur more commonly in patients that have received penicillin or ampicillin.

34- Which of the following is a recognised treatment for complications of cystic fibrosis?

- 1) DNAase to assist in reinflating collapsed lung segments. [0]
- 2) Rectal pull-through and anastomosis for rectal prolapse. [0]
- 3) Pancreatic transplant for diabetes mellitus. [0]
- 4) Nebulised tobramycin for pseudomonas colonisation of the lower respiratory tract. [100]
- 5) Hypotonic saline drinks for hypernatraemic dehydration. [0]

Human recombinant DNAase given as a single daily aerosol seems to improve pulmonary function, decrease the frequency of chest exacerbations, and promotes a sense of well-being in patients with mild to moderate disease with purulent secretions. This may be because, in the inflamed airway, the nuclei from dead cells accounts for much of the viscosity of secretions. Rectal prolapse is usually idiopathic, occurring between 1 and 5 years. Intestinal parasites, malnutrition, acute diarrhoea, ulcerative colitis, pertussis, Ehler's Danlos Syndrome, meningocele, cystic fibrosis, and chronic constipation can also predispose to it. Following defecation the prolapse usually resolves spontaneously, or through manual reinsertion by the patient or parent. Nebulised tobramycin or gentamicin may be given when airway pathogens are resistant to oral antibiotics, or where infection is difficult to control at home. Hypernatramic dehydration should be treated in the usual way.

35- Which of the following is a typical feature of Farmer's lung?

- 1) basal crackles [100]
- 2) Eosinophilia [0]
- 3) Haemoptysis [0]
- 4) Increased pCO₂ [0]
- 5) Positive serum paraproteins [0]

Commonest occupational extrinsic allergic alveolitis, due to thermophilic actinomycetes. Crackles are typically heard at the bases. Eosinophilia can be seen but is not typical. Immunoglobulin levels are frequently elevated but not a paraprotein. P_{O2} may be decreased particularly with exercise. A restrictive pattern on LF studies is seen. (Dr Shu Ho)

36- A 28 year old man who had had tuberculosis of the mediastinal lymph nodes diagnosed two weeks previously and who had been started on chemotherapy with rifampicin, isoniazid and pyrazinamide was admitted because of the increasing dyspnoea and stridor.

Chest X-ray showed compression of both main bronchi by carinal lymph node enlargement.

What is the next step in management?

- 1) Start prednisolone [100]
- 2) Mediastinoscopy and biopsy [0]
- 3) Refer for stent insertion/tracheostomy [0]
- 4) Refer for urgent CT scan of the mediastinum [0]
- 5) The addition of ethambutol [0]

The treatment of TB mediastinal lymphadenitis is the same as pulmonary TB. The nodes may enlarge during or after treatment as a result of hypersensitivity. Corticosteroids is effective in reducing the enlargement and hence will help the stridor and breathlessness.

37- A 24 year old male presents after developing a bluish discolouration of the body, lips and nails. He denies any relevant past medical history. Examination reveals a central cyanosis and a grey complexion.

Investigation revealed:

Haemoglobin 17.0 g/dL (13.0-18.0)

PaO₂ 13.0 kPa (11.3-12.6)

SaO₂ (using an oximeter) 85% (>95)

What is the most likely diagnosis?

- 1) Argyria [0]
- 2) Cyanotic congenital heart disease [0]
- 3) Haemochromatosis [0]
- 4) Methaemoglobinaemia [100]
- 5) Methylene blue poisoning [0]

This patient is otherwise well and has no specific features of congenital heart disease (clubbing etc). He appears desaturated with sats of 85% yet good pO₂. This is a typical description of methaemoglobinaemia which is the accumulation of reversibly oxidised methaemoglobin causing reduced oxygen affinity of the Hb molecule with consequent cyanosis. It can occur due to an inherited condition or as a consequence of drugs such as nitrites.

Argyria is colloidal silver toxicity. more ...

<http://together.net/~rjstan/rose1.html>

38- Which of the following is true of BCG vaccination?

- 1) is contraindicated in neonates [0]
- 2) is a killed polysaccharide antigen vaccine [0]
- 3) should be given to all children who have a strongly positive tuberculin test [0]
- 4) is presently routinely offered in the UK at age 16 years [0]
- 5) Provides protection against leprosy [100]

a - BCG vaccine may given to newborns at high risk of exposure. b - The BCG vaccine is an attenuated strain - it provides approximately 70% protection. c - It should NOT be given to these children. A low reactivity Heaf test (grade 0 - 1) should be documented before administration. d- BCG is given at Comprehensive school entry (age 11 - 13). e - It has also found a use in stimulating the immune system for the treatment of some cancers.

39 -Carcinoid tumors of the lung (bronchial adenomas) originate from which of the following cell types?

- 1) Ciliated cell [0]
- 2) Clara cell [0]
- 3) Kulchitsky (K) cell [100]
- 4) Mucus (goblet) cell [0]
- 5) Type 2 Alveolar cell [0]

40- A 55-year-old woman on treatment for long-standing rheumatoid arthritis has recently become dyspnoeic on mild exertion and developed a dry cough. The oxygen saturation was found to be 87% on air. The chest x-ray showed a diffuse bilateral interstitial infiltrate. An extensive infection screen was negative and her symptoms were felt to be drug-induced.

Which drug is most likely to have caused this adverse effect?

- 1) azathioprine [0]
- 2) cyclosporin [0]
- 3) hydroxychloroquine [0]
- 4) methotrexate [100]
- 5) sulphasalazine [0]

Methotrexate is a well recognised cause of acute pneumonitis and interstitial lung disease. It is a rare complication of methotrexate therapy but is often fulminant and can be fatal.

41- The following is true about Cystic Fibrosis:

- 1) Is an autosomal dominant condition. [0]
- 2) Is due to mutation of CFTR gene on chromosome 17 [0]
- 3) Skin test may be positive for aspergillus [100]
- 4) Median survival rate is 10 to 15 years. [0]
- 5) Is a cause of mental retardation. [0]

Cystic fibrosis is an autosomal recessive condition and is due to mutation of CFTR gene on chromosome 7. 20% develop bronchopulmonary aspergillosis. Median survival rate is 25 to 35 years and is currently improving.

42- A 67-year-old man presents with a long history of cough, breathlessness on minimal exertion and ankle swelling. He smokes 30-40 cigarettes per day.

Investigations are as follows:

Haemoglobin 19g/dl
white blood count 7.3
PaO₂ (air) 6.2kPa
PaCO₂ (air) 8.9kPa
serum [H⁺] 44 nmol/l
serum [HCO₃⁻] 36 mmol/l

What is the most likely explanation of these results?

- 1) acute respiratory acidosis [0]
- 2) chronic respiratory acidosis [100]
- 3) chronic respiratory alkalosis [0]
- 4) metabolic acidosis [0]
- 5) metabolic alkalosis [0]

Normal range $[H] = 36-44\text{nM}$. Normal range $[HCO_3] = 21 - 27.5\text{mM}$. Even if you did not know the normal reference values for H and HCO_3 , you should have been able to make an intelligent guess at compensated respiratory acidosis from the clinical history, type 2 respiratory failure and probable secondary polycythaemia.

43- Which of the following statement is true of infections with Mycobacterium tuberculosis:

- 1) non-sputum producing patients are non-infectious [100]
- 2) a positive tuberculin test indicates active disease [0]
- 3) lymph node positive disease requires longer treatment than pulmonary disease [0]
- 4) in pregnant women treatment should not be given until after delivery [0]
- 5) pyrazinamide has high activity against active extracellular organisms [0]

Only untreated smear positive pulmonary TB is likely to be infectious. Active disease may be indicated by grade III/IV response to tuberculin. 80% of individuals with history of BCG vaccination have grade I/II response. All forms of pulmonary TB may be treated equally except tuberculous pleural effusion which may require drainage (with large effusions causing breathlessness) and adjunct corticosteroids to delay reaccumulation. Length of treatment for other forms are bone TB 9 months, meningitis 1 year, drug resistance 2 years. Streptomycin has high activity against extracellular organisms whilst pyrazinamide have high activity against intracellular organisms.

44- In restrictive lung disease due to respiratory muscle weakness, which of the following statements is true?

- 1) Low FEV1/FVC, high RV/TLC [0]
- 2) Low FEV1/FVC, normal TLC [0]
- 3) Low VC, low FEV1, normal TLC, low RV/TLC [0]
- 4) Low VC, low RV, low TLC [0]
- 5) Low VC, low TLC, high RV/TLC [100]

45- Which of the following would be the least likely finding in a patient with sarcoidosis?

- 1) Hepatic granulomas [0]
- 2) Restrictive pulmonary function tests [0]
- 3) Skin lesions [0]
- 4) Uveitis [0]
- 5) X bodies on bronchoalveolar lavage (BAL) fluid [100]

46- A 72-year-old lifelong smoker presents with progressive dyspnoea on exertion. He has a chronic, nonproductive cough. On examination he is thin, breathing with pursed lips, respiratory rate 25/min, with mild wheezing on chest auscultation.

Investigations show

FEV1 0.8 L
FVC 1.6 L
pH 7.35
paCO₂ 45 mmHg

paO₂ 55 mmHg

What is the predominant mechanism of the airflow limitation in this gentleman?

- 1) Bronchospasm [0]
- 2) Foreign body obstruction [0]
- 3) Increased airways resistance [0]
- 4) Loss of elastic recoil [100]
- 5) Mucus plugging in the small airways [0]

47- Which of the following statements regarding cryptogenic fibrosing alveolitis is correct?

- 1) Active inflammation may be suggested by a CT scan [100]
- 2) peak flow rate is a good guide to severity [0]
- 3) 80 per cent of patients initiate [0]
- 4) Reduced cardiac output [0]
- 5) Reduced airway resistance [0]

discriminating question! Acclimatisation results in increased Hb with erythrocytosis. Periodic respiration is a feature of non-acclimatisation. Respiration is normal when subjects are acclimatised to altitude as is cardiac output. Pulmonary artery pressure increases in an effort to oxygenate more blood. 2,3-DPG increases.

Here's a good read from Trek Nepal.

<http://www.project-himalaya.com/infohealth-AMS.html>

58- A 59 year old female smoker is diagnosed with oat cell carcinoma of the bronchus. Which of the following relating to this diagnosis is true?

- 1) The tumour is likely to be radiosensitive [0]
- 2) occurs with equal frequency in smokers and non-smokers [0]
- 3) has a 5 year survival greater than 20% [0]
- 4) Is associated with the elaboration of ectopic ADH secretion [100]
- 5) Is typically associated with ectopic parathormone secretion. [0]

a - it is very radioresistant b - adenocarcinoma is not cigarette dependent c - the 5 year survival rate is less than 5% d - due to inappropriate secretion of antidiuretic hormone e- Squamous cell carcinoma classically elaborates PTHrp (Cornwall Trainers)

59- Which of the following conditions may give a false/positive sweat test?

- 1) Congenital adrenal hyperplasia [0]
- 2) Hyperthyroidism [0]
- 3) Hyperparathyroidism [0]
- 4) Obesity [0]
- 5) Glucose-6-phosphatase deficiency [100]

Non-cystic fibrosis conditions associated with elevated concentrations of sweat electrolytes include:

Endocrine: Untreated adrenal insufficiency, hereditary nephrogenic diabetes insipidus, hypothyroidism, hypoparathyroidism.

Metabolic: Glucose-6-phosphatase deficiency, mucopolysaccharidoses, fucosidosis.

Other: Ectodermal dysplasia, familial cholestasis, pancreatitis, malnutrition.

60- A 60-year-old man was diagnosed last year with adenocarcinoma of the lung, and a 4 cm mass lesion was treated with a right lower lobectomy. He now has an abdominal CT scan that reveals scattered hepatic mass lesions and hilar lymphadenopathy. For several weeks, he has had increasing malaise. A urinalysis reveals marked proteinuria, and a 24 hour urine protein collection is 2.7 g/24hr. His serum urea is 30 mmol/L (2.5 - 7.5) with creatinine of 450 μ mol/L (60 - 110). A renal biopsy is performed, and there is focal deposition of IgG and C3 with a granular pattern. He is most likely to have which of the following conditions?

- 1) Goodpasture's syndrome [0]
- 2) Membranous glomerulonephritis [100]
- 3) Minimal change glomerulonephritis [0]
- 4) Nodular glomerulosclerosis [0]
- 5) Rapidly progressive glomerulonephritis [0]

Most cases of membranous GN are idiopathic, but in some patients there is a history of an infection or a malignancy (usually lung) with antigenemia.

61- The morphological appearance of *Pneumocystis carinii* infection in the lung is best characterised as which one of the following?

- 1) A bronchopneumonia with abscess formation [0]
- 2) A haemorrhagic and necrotizing pneumonia [0]
- 3) An acute respiratory distress syndrome (ARDS) with widespread hyaline membrane formation [0]
- 4) An interstitial pneumonitis with foamy intra-alveolar exudate [100]
- 5) An organizing bronchopneumonia [0]

Pneumocystis carinii is a fungal organism. In PC pneumonia, the organism is confined to the alveolar space of the lung and produce debris and cysts in the alveolar space with interstitial infiltration of lymphocytes and plasma cells. As a result, it can cause profound disturbance of oxygen exchange and fatal hypoxaemia if left untreated.

62- Which of the following statements is NOT true of primary pulmonary tuberculosis:

- 1) It is characteristically asymptomatic [0]
- 2) Miliary spread is commoner in a younger age group [0]
- 3) The initial immunological response causes hilar lymphadenopathy [0]
- 4) pleural effusion occurs before tuberculin skin testing is positive [0]
- 5) A positive tuberculin skin test develops within two weeks of infection [100]

Primary TB is usually asymptomatic, with miliary TB most likely to occur in young children. The Ghon focus is the area of consolidation from cellular infiltration and response to uptake of organisms by macrophages, which transform into epithelioid

cells and group into granulomata. Bacilli are transported via lymphatics early in disease process to regional lymph nodes to cause marked lymphadenopathy. Positive tuberculin test occurs between 3 weeks to 3 months after primary infection. Pleural and pericardial infections occur at or shortly after primary infection.

63- In which of the following have randomised controlled trials shown that long-term oxygen therapy (LTOT) reduces mortality?

- 1) Asthma [0]
- 2) Cor pulmonale due to chronic airflow obstruction [100]
- 3) Cryptogenic fibrosing alveolitis [0]
- 4) Cystic fibrosis [0]
- 5) Pulmonary sarcoidosis [0]

Adequate data for LTOT prolonging survival exists only for COPD although in practice it is assumed to apply in other chronic hypoxaemic lung conditions.

64- Which ONE of the following is true regarding acute pulmonary embolism?

- 1) a normal ECG excludes the diagnosis [0]
- 2) embolectomy is more effective than thrombolysis in improving survival [0]
- 3) Heparin is as effective as thrombolytic therapy [0]
- 4) the presence of hypoxaemia is an indication for thrombolysis [0]
- 5) thrombolysis administered through a peripheral vein is as effective as through a pulmonary artery catheter [100]

Embolectomies are rarely done nowadays due to the excellent results with thrombolysis. Thrombolytic therapy is reserved for those with severely compromised circulation (equally effective through peripheral vein or via catheter in pulmonary artery). Heparin reduces risk of further embolism (anticoagulant) and reduces pulmonary vasoconstriction.

65- A 36 year old man complains of a persistent cough. A CXR shows fibrosis of both upper lobes. What is the most likely diagnosis?

- 1) Systemic Sclerosis [0]
- 2) Primary Pulmonary Hypertension [0]
- 3) Cystic Fibrosis [0]
- 4) Ankylosing Spondylitis [0]
- 5) Allergic bronchopulmonary aspergillosis [100]

The persistent cough is likely to be a symptom of asthma. On the other hand, only about 1% of patients with advanced ankylosing spondylitis develop apical fibrosis ie rare . Even then, early lesions are asymptomatic. It is when only when cavitation develops that symptoms like cough, infected sputum and haemoptysis start. With ABPA, fibrosis and loss of volume in the upper lobes are common. Within these upper lobes, there may be bronchiectasis.

66- Which one of the following statements is true of chronic obstructive pulmonary disease?

- 1) patients show at least a 15 per cent improvement in the FEV1 after nebulised bronchodilator [0]
- 2) inhaled corticosteroid usage does not improve long-term prognosis [100]
- 3) breathlessness is uncommon until the FEV1 falls to approximately 50 per cent of predicted [0]
- 4) emphysema is associated with increased transfer factor [0]
- 5) in advanced cases there is reduced pulmonary vascular resistance [0]

1- This level of improvement would mean the presence of asthma. 2- High dose inhaled steroids have been shown (ISOLDE) to improve quality of life and reduce hospitalisation rates by reducing the number of exacerbations, but it does not slow the rate of decline of FEV1 (hence does not affect prognosis). 3- Breathless is common but subjective. Mild COPD (60 - 79% predicted FEV1) are often unknown to their GP. Those with moderate COPD (40 - 59% predicted) are seen intermittently seen by GP, whilst those with severe disease (< 40% predicted) have frequent hospital and GP visits. 4- It is asthma which is associated with normal or increased transfer facotr. COPD is associated with decreased transfer factor. 5- COPD is associated with secondary pulmonary hypertension.

67- A 16 year old boy with cystic fibrosis presents with abdominal pain. Which of the following is most likely to be the cause?

- 1) Ulcerative colitis [0]
- 2) Irritable Bowel Syndrome [0]
- 3) Pyelonephritis [0]
- 4) Meconium Ileus Equivalent Syndrome [100]
- 5) Renal Calculi [0]

Meconium ileus equivalent or distal intestinal obstruction syndrome occurs in older children and adults with CF and presents with colicky abdominal pain, distension, vomiting and failure to pass faeces. The plain AXR confirms small bowel obstruction. Initial management includes rehydration with IV fluids and oral N- acetyl cysteine. Other GI complications of / associations with CF include liver cirrhosis, gall bladder disease, pancreatitis, peptic ulceration, hiatus hernia, coeliac disease and Crohns disease.

68- A patients' arterial blood gases give the following results; pO2 10 kPa (75mmHg), pCO2 7 kPa (52 mmHg), pH 7.47, [HCO3-] 37. Which of the following is the most likely cause?

- 1) Chronic Hyperventilation Syndrome [0]
- 2) Acute exacerbation of COPD [0]
- 3) Several days of Pyloric obstruction [100]
- 4) Pulmonary Embolism [0]
- 5) Diabetic Coma [0]

These results demonstrate a metabolic alkalosis and there is respiratory compensation with an elevation of pCO2 in an effort to compensate for the alkalosis. Consequently, pO2 is slightly low. The most probable cause is pyloric stenosis.

69- A patient with Rheumatoid arthritis complains of progressive breathlessness. Which of the following is the most likely cause?

- 1) Pulmonary Eosinophilia [0]
- 2) Asthma [0]
- 3) Pulmonary nodules [0]
- 4) Fibrosing Alveolitis [100]
- 5) Pulmonary Embolus [0]

Fibrosing alveolitis associated with rheumatoid arthritis is indistinguishable from cryptogenic fibrosing alveolitis. It presents with progressive breathlessness and cough. Signs include finger clubbing, cyanosis and bilateral end inspiratory crackles. Other pulmonary complications of Rheumatoid arthritis include pleural effusions, empyema, cryptogenic organising pneumonia, bronchiectasis and pulmonary nodules. The latter are usually asymptomatic but may cavitate resulting in haemoptysis and when occurring with coal workers pneumoconiosis (Caplans Syndrome) are associated with breathlessness.

70- In the normal adolescent lung which of the following is correct?

- 1) There is an intrapleural pressure of 30 cmH₂O (3kPa) at the end of normal expiration. [0]
- 2) There is a resting pulmonary blood flow of 10L/min. [0]
- 3) The V:Q ratio is greater in apical than basal segments of the lung when upright and at rest. [100]
- 4) The majority of airway resistance is from large airways. [0]
- 5) Cartilage is present in all respiratory bronchioles. [0]

Because of surfactant, the pressure difference across the pleura required to inflate the lungs, is usually no more than about 4cmH₂O. Resting pulmonary blood flow in an adult is around 5L/min. Gas rises, so the V:Q ratio is higher in the apical than the basal segments. The majority of airway resistance is from small airways, which is why asthmatics have a vastly increased airway resistance. Cartilage disappears in the terminal bronchioles.

71- Sleep Apnoea syndrome is best diagnosed by the following:

- 1) Polygraphic Sleep Studies [100]
- 2) therapeutic trial of amphetamines [0]
- 3) EEG [0]
- 4) Blood gases during apneic episodes [0]
- 5) Presence of HLA-DR2 and DQw1 [0]

Sleep apnoea is characterized by cessation of breathing during sleep, which causes extreme restlessness with frequent respiratory pauses and snoring during night sleep, and by daytime drowsiness and irritability. The diagnosis is established by polygraphic recording of sleep which shows periods (at least 30 of 10 or more seconds duration in 7 h of sleep) of apnoea, associated with a fall in arterial oxygen saturation.

72- A 70-year-old man presented with weight loss and haemoptysis. He was a heavy smoker. A chest radiograph showed a mass lesion in the left lung bronchoscopic biopsies confirmed a squamous carcinoma.

- 1) Chest wall invasion by primary tumour [0]
- 2) An enlarged mediastinal lymph node on CT scanning [0]
- 3) Forced expiratory volume (FEV1) of 1.2 litres [0]
- 4) Hypercalcaemia [0]
- 5) Malignant pleural effusion [100]

Inoperable non-small cell carcinoma are Stages IIIb or IV (distant metastasis). Stage IIIb is either N3 (metastasis to contralateral mediastinal lymph nodes, contralateral hilar lymph nodes, ipsilateral supraclavicular lymph nodes) or T4 (tumour of any size invading mediastinum or involving heart, great vessels, trachea, oesophagus, vertebral body, carina or presence of malignant pleural effusion). Hypercalcaemia may be a non-metastatic manifestation (ectopic PTH-like hormone). Further lung function tests are needed (eg transfer factor, exercise testing) if post-bronchodilator FEV1 <1.5 litres for lobectomy, and FEV1 <2 litres for pneumonectomy.

73- Which of the following statements regarding prognosis in lung cancer is true?

- 1) Combined modality therapy (chemotherapy, radiation therapy and surgery) has improved overall lung cancer survival to 40% at 5 years. [0]
- 2) Overall lung cancer survival is < 15% at 5 years. [100]
- 3) Patients undergoing radiation therapy have a 5 year survival of 40%. [0]
- 4) Patients who qualify for surgery have a 50% 5 year survival. [0]
- 5) With chemotherapy, overall survival in small cell (oat cell) carcinomas has risen to 60% at 5 years. [0]

74- A breathless patient undergoes pulmonary Function testing. The following results are obtained; FEV1 = 74% predicted, FVC = 68% predicted, TLC = 77% predicted, Tlco = 46% predicted, Kco = 53% predicted. Which of the following is the most likely cause ?

- 1) COPD [0]
- 2) Asthma [0]
- 3) Cryptogenic Fibrosing Alveolitis [100]
- 4) Morbid obesity [0]
- 5) kyphoscoliosis [0]

The restrictive lung pattern together with the reduced Tlco and Kco suggest lung fibrosis.

75- A lifelong non-smoker is diagnosed with emphysema. Which of the following would be the most likely aetiological agent ?

- 1) Isocyanates [0]
- 2) Cadmium Exposure [100]
- 3) Steel [0]
- 4) Zinc [0]
- 5) Asbestos [0]

Cadmium fume inhalation is a recognised cause of emphysema. Other industrial associations with COPD include coal, cotton, grain and cement.

76- Which cell type is responsible for the early asthmatic response?

- 1) Basophil [0]
- 2) Eosinophil [0]
- 3) Mast cell [100]
- 4) Neutrophil [0]
- 5) TH1-lymphocyte [0]

77- A 43-year-old Caribbean female Comprehensive school teacher complains of slowly increasing breathlessness. She has no smoking history. Investigations reveal she has bilateral enlarged hilar lymph nodes, elevated serum calcium, interstitial lung disease, and enlarged liver and spleen. What is the most likely diagnosis?

- 1) Coccidioidomycosis [0]
- 2) Hyperparathyroidism [0]
- 3) Hypervitaminosis D [0]
- 4) Sarcoidosis [100]
- 5) Tuberculosis [0]

78- A 58-year-old man presents with weight loss and haemoptysis. He has smoked most of his life. On examination he is clubbed and has clinical evidence of right pleural effusion. His serum calcium is 3.2mM. Which of the following histological type of lung cancer is he most likely to suffer from?

- 1) mesothelioma [0]
- 2) small cell carcinoma [0]
- 3) large cell carcinoma [0]
- 4) squamous cell carcinoma [100]
- 5) adenocarcinoma [0]

Hypercalcaemia in absence of bony metastases occurs in about 15% of squamous cell lung carcinoma from parathyroid hormone related protein (PTHrP) production. This is a feature of non-metastatic manifestation of malignancy. Inappropriate ADH secretion (hyponatraemia) and ectopic ACTH production (Cushings syndrome) occur with small cell lung cancer. Clubbing is predominantly associated with squamous cell cancers and occasionally adenocarcinoma.

79- A 68-year-old man presents with a one-month history of dyspnoea and a 3kg weight loss. On examination there were signs of a large left pleural effusion, confirmed on Chest X-ray.

Investigations revealed:

Pleural fluid analysis:

Protein 38 g/L

Cytology a few lymphocytes and red blood cells.

Which one of the following investigations should be considered next?

- 1) Bronchoscopy. [0]
- 2) CT scan of thorax. [0]
- 3) Repeat pleural aspiration with biopsy. [0]
- 4) Thoracoscopic pleural biopsy. [100]
- 5) Tuberculin test. [0]

Video-assisted thoracoscopic surgery (VATS) can 1) do good pleural biopsies 2) clear all the pleural fluid 3) allow pleurodesis to prevent recurrence. Usually the surgeons can do bronchoscopy at the same time under general anaesthetic. The main issue is perhaps to alleviate his symptoms with the large effusion which bronchoscopy will not do if it was the next investigation. CT chest should be done after the fluid is drained. Percutaneous pleural biopsies do not produce good samples and are less often done.

80- A 63-year-old woman presents a 5 day history of progressive shortness of breath. Her family brought her in because she was increasingly sleepy during the last 24 hours. She was diagnosed with Chronic Obstructive Pulmonary Disease 3 years ago and has a FEV1 less than 50% of predicted. She has an oxygen concentrator at home.

Examination revealed depressed consciousness and a respiratory rate of 24 with shallow breaths. There were decreased breath sounds with minimal air movement. If an arterial blood gas on room air were to be performed, which of the following results would you expect?

- 1) pH 7.16 paCO₂ 70 paO₂ 50 HCO₃ 24 [0]
- 2) pH 7.24 paCO₂ 80 paO₂ 55 HCO₃ 30 [100]
- 3) pH 7.32 paCO₂ 60 paO₂ 70 HCO₃ 30 [0]
- 4) pH 7.41 paCO₂ 40 paO₂ 50 HCO₃ 24 [0]
- 5) pH 7.48 paCO₂ 30 paO₂ 85 HCO₃ 24 [0]

81- A 47 year old woman presenting with breathlessness has arterial blood gases taken which give the following results: pO₂ 8.7 kPa (65mmHg), pCO₂ 4.4 kPa (33mmHg), pH 7.46, {HCO₃⁻} 24. Which of the following is the most likely diagnosis.

- 1) Hyperventilation syndrome [0]
- 2) Acute severe asthma [100]
- 3) Emphysema [0]
- 4) Kyphoscoliosis [0]
- 5) Opiate overdose [0]

The patient has an acute respiratory alkalosis with associated hypoxia. This is consistent with an acute asthmatic attack. A normal or rising CO₂ is an ominous sign indicative of a life threatening attack and the need to consider ventilatory support. Patients with hyperventilation syndrome do show a respiratory alkalosis but this is not associated with hypoxia.

82- Which of the following forms of pulmonary embolism is the commonest cause of secondary pulmonary hypertension?

- 1) Air embolism (Caisson's disease) [0]

- 2) Fat embolism [0]
- 3) Massive pulmonary embolism (e.g., saddle embolism) [0]
- 4) Multiple small recurrent pulmonary embolism [100]
- 5) Paradoxical embolism [0]

83- Primary Pulmonary tuberculosis:

- 1) Leads to pleural effusion [0]
- 2) Is highly infective [0]
- 3) Commonly leads to military TB [0]
- 4) May be totally asymptomatic [100]
- 5) Usually produces cavitation [0]

Primary Pulmonary tuberculosis is often asymptomatic consisting of primary complex. Cavitation and pleural effusions are a manifestations of post primary TB.

84- An elderly man with a history of asthma, congestive heart failure, and peptic ulcer disease is admitted with bronchospasm and rapid atrial fibrillation. He receives frequent nebulised salbutamol and IV digoxin loading, his regular medications are continued. 24 hours after admission his serum potassium is noted to be 2.8 mmol/l. Which of his medications is most likely to have caused this abnormality.

- 1) Digoxin [0]
- 2) ACE inhibitor [0]
- 3) Salbutamol [100]
- 4) Ranitidine [0]
- 5) Spironolactone [0]

Salbutamol given in regular nebulised doses or IV is commonly associated with hypokalaemia. Spironolactone and ACE inhibitors commonly cause hyperkalaemia (their use in combination is potentially dangerous and requires regular monitoring of serum electrolytes). Electrolyte disturbance with Ranitidine is very uncommon. Digoxin doesn't cause hypokalaemia (unless due to vomiting associated with digoxin toxicity). Hypokalaemia (usually diuretic induced) does increase cardiac sensitivity to Digoxin and correction of hypokalaemia is recommended to avoid arrhythmias.

85- The parents of a child with cystic fibrosis consult you wishing to know what is the risk of their next child being a carrier of the condition. Which ONE of the following percentages is the correct risk?

- 1) 0% [0]
- 2) 25% [0]
- 3) 50% [100]
- 4) 75% [0]
- 5) 100% [0]

As both parents are carriers for the CF gene then the chances of another child being affected (homozygote) is 1 in 4 (25%). The chances of their child being free from the CF gene is also 1 in 4 (25%) and the chances of a child being a carrier (heterozygote) is 1 in 2 (50%).

86- Most of the cells that fill the alveoli in desquamative interstitial pneumonitis (DIP) are which of the following?

- 1) Eosinophils [0]
- 2) Lymphocytes [0]
- 3) Macrophages [100]
- 4) Neutrophils [0]
- 5) Plasma cells [0]

87- A 50-year-old male is taken to the General Practitioner by his long suffering wife. His snoring (which has been steadily increasing in loudness over the past 18 months) is troublesome at home. She says that he makes noises and moves around whilst asleep.

He reports no problems with sleeping. He does admit to gaining 20 kg in weight over the past one year, and to falling asleep during the day.

A sleep study is performed. Which of the following findings would be most compatible with this man's clinical presentation?

- 1) Fragmented sleep, cessations of airflow measured at the nose accompanied by an increase in oesophageal pressure swings and episodic oxygen desaturation. [100]
- 2) Normal sleep quality, bradycardic episodes, oxygen desaturation but normal airflow. [0]
- 3) Normal sleep quality but cessations of airflow measured at the nose with decreased abdominal wall motion during these flow cessations. [0]
- 4) Progressive oxygen desaturation during the night and alternating periods of hyperventilation and hypoventilation. [0]
- 5) Tachycardia, sleep fragmentation, episodes of hypoventilation with minimal oxygen desaturation. [0]

88- A 42 year old woman presents with an acute attack of asthma. She is able to speak in short sentences.

Her respiratory rate is 28 breaths per minute and the peak expiratory flow rate 120L/min (predicted 480 L/min).

What is the most appropriate treatment for this patient?

- 1) Intravenous aminophylline. [0]
- 2) Intravenous salbutamol [0]
- 3) Nebulized salbutamol [100]
- 4) Oral salbutamol [0]
- 5) Oral theophylline [0]

This patient has features of acute severe asthma, and should be given oxygen, steroids and nebulised salbutamol as immediate treatment. Although the PFR is less than 33% of predicted normal (feature of life threatening attack), we do not know what her previous best is. It could be low eg 240L/min. If it had been a life threatening attack, nebulised ipratropium and iv aminophylline, salbutamol or terbutaline should be

given. The guidelines do not specify a preference. This is another clue that the answer should be nebulized salbutamol.

89- A 15 year old boy presented with wheezing when playing football and nocturnal cough.

Which is the best test to confirm the underlying condition?

- 1) A trial of oral corticosteroids [0]
- 2) A trial of inhaled corticosteroids [0]
- 3) A trial of inhaled salbutamol [0]
- 4) Serial peak expiratory flow rate measurements [100]
- 5) Spirometry alone [0]

Demonstration of variable obstruction of the airways provides good evidence for asthma, with its characteristic morning dips. Failure to respond to bronchodilator therapy does not exclude asthma as response may be small in children, and in adults with persistent or more severe asthma. Those who fail to respond to inhaled bronchodilator require a steroid trial (either 4 weeks of high dose inhaled steroids or 2 weeks of oral Prednisolone).

90- Which of the following is NOT true with regard to the radiological appearance of a chest X-ray?

- 1) Consolidation of the right middle lobe will obliterate the right atrial shadow in the PA view [0]
- 2) Consolidation of the right apical lobe will extend to the horizontal fissure in the PA view [0]
- 3) Consolidation of the right anterior segment of the right middle lobe will extend to the right transverse fissure and the right hilum in PA view [0]
- 4) A consolidation of the lingular lobe will obliterate the aortic knuckle and pulmonary trunk in the PA view [0]
- 5) A consolidation of the left lower lobe will elevate the left hemidiaphragm [100]

Consolidation in left lower lobe obliterates the diaphragm, whilst lingular consolidation will obliterate the left heart border. Oblique fissure runs obliquely at 45° from T4 or 5 vertebra to anterior costophrenic angle on lateral chest film. The horizontal fissure runs from the hilum anteriorly to anterior chest wall. The area above the horizontal fissure is upper lobe, below the horizontal fissure is the middle lobe and below the oblique fissure is the lower lobe.

91- Which of the following statements is true of psittacosis (ornithosis):

- 1) It is only a risk from contact with psittacines (parrots), not other birds [0]
- 2) It usually causes many polymorphs to be present in the sputum [0]
- 3) It is more of a risk to children than to adults who are exposed to birds [0]
- 4) It does spread from person to person [100]
- 5) Infection responds rapidly to penicillin therapy [0]

Chlamydia psittaci is endemic in birds including psittacine birds, canaries, finches, pigeons and poultry. Pet owners, vets and zoo keepers are most at risk. Rare in

children. Person-person transmission occurs especially in a hospital environment. Sputum Gram stain reveals a few leucocytes and no predominant bacteria. Few signs/few lab/xray findings. Positive serology with complement-fixing antibodies. treat with tetracycline.

92- Which of the following statements is true regarding smoking in pregnancy?

- 1) Smoking assists in maturation of the fetal lung. [0]
- 2) The reduction in birth weight is related to the number of cigarettes smoked per day. [100]
- 3) Maternal smoking may adversely affect testicular function in male children. [0]
- 4) Dysmorphic facies is a recognised complication. [0]
- 5) The newborn baby may require adjustments in drug dosages because of it. [0]

Smoking reduces birth weight which may be of critical importance if the baby is born pre-term. On average, the babies of smokers weigh 170g less than non-smokers, but the reduction in birth weight is related to the number of cigarettes smoked per day. Smoking is also associated with an increased risk of miscarriage and still birth. The infant has a greater risk of Sudden Infant Death Syndrome. There is some evidence that maternal smoking may adversely affect ovarian function in female children. No dysmorphic syndrome has yet been described.

93- A 54-year old woman was admitted with acute breathlessness. On examination she had a temperature of 37.9°C, a respiratory rate of 32 breaths per minute, a pulse of 120 beats per minute, a blood pressure of 100/60 mmHg, and a peak expiratory flow rate of 250 litres per minute. Auscultation of the heart and chest was normal. The Chest X-ray was normal and blood gases on air showed: pH 7.35 (7.36 - 7.44)

PaO₂ 6.0

kPa (11.3 - 12.6)

PaCO₂ 3.9

kPa (4.7 - 6.0)

Serum bicarbonate 20 mmol/l (20 - 28)

She was started on high flow oxygen. What is the most important next treatment?

- 1) amoxycillin intravenously [0]
- 2) aminophylline intravenously [0]
- 3) intravenous fluids [0]
- 4) low molecular weight heparin [0]
- 5) nebulised salbutamol [100]

This patient has features of a severe acute asthma attack with Type 1 respiratory failure with mixed acid-base disturbances. Respiratory alkalosis is the commonest acid-base abnormality in acute asthma, but lactic acidosis in peripheral tissues may cause mixed acid-base disturbances. The British Thoracic guidelines suggest immediate treatment with high flow oxygen, nebulised salbutamol and corticosteroids. If there had been life-threatening features present (peak flow <33% predicted or best, silent chest, feeble respiratory effort, bradycardia, hypotension, exhaustion, confusion or coma), then add nebulised ipratropium and iv aminophylline or salbutamol. Although PE can cause low PaO₂, and normal or reduced PaCO₂, spirometry is usually normal or mildly reduced. Hence PE is less likely in this case.

94- A 45 year old female presents with a 6 month history of exertional dyspnoea and is diagnosed with pulmonary fibrosis. Over the last one year she has received a variety of medications. Which of the following drugs could be responsible?

- 1) Dexamethasone [0]
- 2) Ibuprofen [0]
- 3) nalidixic acid [0]
- 4) penicillamine [0]
- 5) sulphasalazine [100]

Sulphasalazine as well as other rheumatology drugs such as Gold, Methotrexate can cause pulmonary fibrosis. Bleomycin and Cyclophosphamide rather than vincristine may be responsible. Corticosteroids are sometimes given as a trial in pulmonary fibrosis. Nalidixic acid is associated with seizures and visual disturbances. However nitrofurantoin is well recognised to cause PF. Other drugs include amiodarone and nitrofurantoin

.95- Which one of the following is correct regarding long-acting beta-2 agonists?

- 1) Can be used to prevent activity-induced symptoms without anti-inflammatory therapy. [100]
- 2) Become less effective over time (tolerance). [0]
- 3) Are beneficial in acute viral croup. [0]
- 4) Protect against allergen challenge for up to 48 hours. [0]
- 5) Should not be used in association with erythromycin. [0]

Long-acting beta-2 agonists, e.g. salmeterol, can be used twice daily to assist in prophylaxis in chronic asthma as Step 3 of the British Thoracic Society Asthma Guidelines. There is no evidence that the bronchodilator effect wanes with time, though there is debate that it may become less effective in protecting against exercise or methocoline induced bronchospasm. Its duration of action is around 12 hours, and has gone completely by 36 hours. Aminophylline interacts with erythromycin, giving an increased risk of toxicity. There is no evidence that salmeterol works in viral croup, though oral steroids are highly effective.

96- A 45-year-old man develops facial swelling and breathlessness. His chest X-ray reveals paratracheal lymphadenopathy. Which of the following statements is most accurate regarding the superior vena caval obstruction?

- 1) the most common cause is squamous cell carcinoma [0]
- 2) treatment of choice is radiotherapy [0]
- 3) it may be associated with voice hoarseness [100]
- 4) it is associated with Kussmaul's sign [0]
- 5) the commonest symptom is stridor [0]

a) SVCO is most likely caused by bronchogenic carcinoma, especially small cell carcinoma (10% small cell cancers present with SVCO) due to mediastinal lymphadenopathy. Other caused include lymphoma, aortic aneurysm, mediastinal fibrosis and mediastinal goitre. b) Chemotherapy ± radiotherapy is the treatment of choice in small cell carcinoma. Radiotherapy may be the treatment of choice for non-

small cell carcinoma. Median survival of lung cancer presenting with SVCO, even with treatment is 5 months. Lymphoma has better prognosis and will require specific chemotherapy \pm radiotherapy c) Recurrent laryngeal nerve palsy usually occurs with malignant tumour but can occur with aneurysm of aortic arch. There may also be Horner's syndrome due to involvement of sympathetic chain. Compression of vital structures can result in stridor and dysphagia. d) SVCO is associated with elevated non-pulsatile jugular venous pressure. Kussmaul's sign is the paradoxical rise in JVP on inspiration due to constrictive pericarditis or significant pericardial effusion. e) The commonest symptoms are usually cough and chest pain, due to the distortion of mediastinal anatomy. Physical signs are often absent or minimal, but classically there is facial and periorbital oedema, chemosis and distended veins.

97- A 55 year old man presents with ataxia and bilateral gynaecomastia. Which of the following is the most likely diagnosis?

- 1) Klinefelters Syndrome [0]
- 2) Long term treatment with cyclophosphamide for Wegener's Granulomatosis [0]
- 3) Long term treatment with oral steroids for chronic asthma [0]
- 4) Bronchial Carcinoma [100]
- 5) Hypereosinophilic Syndrome [0]

Gynaecomastia is a non metastatic paraneoplastic syndrome usually due to Squamous cell lung cancer. It can be painful and may be associated with testicular atrophy. Ataxia can occur as a result of cerebellar degeneration associated with the malignancy.

98- A 55-year-old plumber presented with a dry nocturnal cough and increasing exertional breathlessness.

On examination he had early finger clubbing, cyanosis and bilateral basal crackles. A chest X-ray showed bilateral lower zone shadowing.

Investigations revealed:

PaO₂ (breathing air) 8.2 kPa (11.3-12.6)
FEV₁/FVC ratio 85%

Which of the following investigations is most likely to establish the diagnosis?

- 1) Echocardiography. [0]
- 2) High resolution CT scan of chest [100]
- 3) Measurement of diffusion capacity [0]
- 4) Serum angiotensin-converting enzyme (ACE) level [0]
- 5) Transbronchial lung biopsy [0]

This patient has a restrictive lung defect and hypoxia, with clinical features of lung fibrosis. With the occupational history, there might have been previous asbestos exposure, although the CXR is not reported to show pleural thickening or plaques. The next test should be one to confirm pulmonary fibrosis. High resolution CT chest is often diagnostic with good correlation to histological abnormalities. A ground-glass

appearance is associated with predominantly cellular appearance on biopsy and more active disease, which responds to treatment and has a better prognosis. A reticular pattern is suggestive of destroyed fibrotic lungs.

99- Which of the following statements regarding the sweat test is true?

- 1) Sweating is enhanced by application of atropine. [0]
- 2) The filter paper is left on for a total of about 4 hours. [0]
- 3) At least 25mg of sweat is necessary for a reliable result. [0]
- 4) More than 60mmol/L of chloride in sweat is diagnostic of cystic fibrosis. [100]
- 5) False/positive results may be encountered in children with nephrotic syndrome. [0]

The sweat test is conducted using pilocarpine iontophoresis. A 3mA current carries pilocarpine into the skin of the forearm stimulating local sweating. The arm is washed with distilled water and sweat collected on a filter paper or gauze. The duration of collection is usually 30-60 minutes. The filter paper is removed, weighed and eluted in distilled water. At least 50mg and preferably 100mg of sweat should be collected for reliable results. It may not be possible to collect this amount in young infants. More than 60mmol/L of chloride is diagnostic of CF when one or more other criteria are present. In healthy adults, the sweat chloride values increase slightly, but 60mmol/L still differentiates CF from other conditions. False/negative results may be encountered in nephrotic syndromes.

100- A 7 month old boy is presented to a doctor by his parents with symptoms of recurrent upper respiratory tract infections. No other members of the family suffer from any similar infections. Physical examination showed mild facial hypoplasia. Biochemistry investigations revealed hypocalcaemia. Microbiological investigations were normal and immunoglobulins were within normal limits. The infant's immune function would show the following deficiency:

- 1) Complement Deficiency [0]
- 2) B cell number and function [0]
- 3) T cell number and function [100]
- 4) Plasma Cell [0]
- 5) Macrophage number and function [0]

This child suffers from DiGeorge's syndrome. Patients with DiGeorge's Syndrome often have near normal levels of immunoglobulins but with significant decreases in T cell numbers and relative increase in the percentage of B cells.

101- Progressive Massive Fibrosis (PMF) is most likely to be found in which of the following?

- 1) Complicated silicosis [100]
 - 2) Extrinsic allergic alveolitis [0]
 - 3) Lobar pneumonia [0]
 - 4) Sarcoidosis [0]
 - 5) Simple coal workers pneumoconiosis [0]
-

Progressive Massive Fibrosis is diagnosed by Chest X-Ray as round masses, several centimetres in diameter usually in the upper lobes. They may have necrotic centres. In silicosis a more accurate term is 'conglomerate nodules'.

102- Which of the following is a recognised feature of massive pulmonary embolism?

- 1) reduced plasma lactate levels [0]
- 2) an increase in serum troponin levels [100]
- 3) an arterial pH less than 7.2 [0]
- 4) blood gases show increased pCO₂ on air [0]
- 5) normal D-dimer levels [0]

Cardiac troponins are reliable markers of myocardial injury that are being used increasingly in patients presenting with undifferentiated chest pain or dyspnea to diagnose an acute coronary syndrome. If elevated cardiac troponin levels also occur in patients with pulmonary embolism because of right ventricular dilation and myocardial injury, such patients could be misdiagnosed. We performed a prospective cohort study to determine the prevalence of elevated cardiac troponin I (cTnI) levels in patients with submassive pulmonary embolism. METHODS: Consecutive patients with objectively confirmed submassive pulmonary embolism and no previous history of ischemic heart disease, other cardiac disease, or renal insufficiency were included. Creatine kinase and cTnI levels were measured within 24 hours of clinical presentation on 2 occasions 8 to 12 hours apart. RESULTS: Of 24 patients with submassive pulmonary embolism, 5 (20.8%) had elevated cTnI levels of 0.4 microg/L or higher (95% confidence interval, 7.1-42.2%). One of these patients had a cTnI level higher than 2.3 microg/L that was suggestive of myocardial infarction. CONCLUSION: Pulmonary embolism should be considered in the differential diagnosis of patients presenting with undifferentiated chest pain or dyspnea and an elevated cardiac troponin level. (Arch Intern Med, 162(1): 79-81 2002)

Hypoxemia and hypocapnoea are common after major pulmonary embolism and may also be found after more minor events. Absence of these phenomena, on the other hand, by no means excludes embolism and their presence is non-specific. In suspected minor embolism this investigation is, at best, only of marginal value. The precise stimulus to hyperventilation is unknown and there is also difficulty in understanding the reasons for hypoxaemia when it is present.

103- Which of the following statements is true of the diffusion capacity of carbon monoxide?

- 1) Is a specific measure of lung perfusion. [0]
- 2) Depends on the thickness of the alveolar wall. [100]
- 3) Depends on the surface area available for gas exchange. [0]
- 4) Is increased in cigarette smokers. [0]
- 5) Is increased in emphysema. [0]

By Fick's law, the volume of gas diffusing across a membrane equals $A/T \times D \times$ difference in partial pressure. In life it is impossible to measure accurately the area (A) or the thickness (T), and these are subsumed into a single constant, the diffusion capacity for carbon monoxide. $DL = \text{volume of transferred carbon dioxide divided by}$

partial pressure difference between the alveoli and the capillary blood. Since the capillary blood normally does not contain carbon dioxide this term disappears. Diffusion will be increased in healthy compared with unhealthy lungs, where the thickness is likely to increase and the surface area available for gas exchange to decrease. VQ imbalances can indirectly interfere with carbon dioxide diffusion capacity by decreasing the available area of lung for gas exchange, but it is not a specific measure of lung perfusion.

104- A 19 year old woman became breathless while travelling on an aeroplane. Which one of the following features most strongly supports a diagnosis of acute hyperventilation related to a panic disorder?

- 1) Carpal spasm. [100]
- 2) Finger paraesthesiae. [0]
- 3) Hypotension. [0]
- 4) Light-headedness. [0]
- 5) Loss of consciousness [0]

We need to distinguish between the signs that may be expected in the tachypnoea associated with the hypoxia from a PE or any other serious respiratory problem and the hyperventilation with increased pO₂ in a panic attack. A carpal spasm would be most likely to reflect this. Finger paraesthesiae can occur with PE, as can hypotension, light-headedness and loss of consciousness. Carpal spasm is found in association with hyperventilation due to the respiratory alkalosis which results in a reduction in ionised calcium concentration.

105- A 64-year-old man is found to have squamous cell bronchogenic carcinoma. Which of the following statements is true regarding surgical resection?

- 1) An FEV₁ of 2 L is a major contraindication to surgical resection. [0]
- 2) Hypercalcaemia makes further assessment for surgery unnecessary. [0]
- 3) Is precluded if a CT scan of the thorax shows enlarged mediastinal lymph nodes. [100]
- 4) Positive sputum cytology excludes the need for bronchoscopic examination of the airways. [0]
- 5) The presence of finger clubbing indicates that liver metastases are already present. [0]

Mediastinal lymphadenopathy is usually associated with a poor prognosis, although there may be a role for surgery and adjuvant chemotherapy in those with metastasis to ipsilateral mediastinal lymph nodes and subcarinal lymph nodes (N2).

Bronchoscopy is useful to identify involvement of carina or if tumour is within 2 cm of the carina which means the cancer is inoperable.

Patients are clearly operable on the basis of spirometry if FEV₁ is greater than 1.5 litres for lobectomy and greater than 2 litres for pneumonectomy. For those with worse spirometric function may need full pulmonary function including transfer factor, and exercise testing.

Finger clubbing is related to HPOA, which is a non-metastatic manifestation of malignancy.

Hypercalcaemia may be associated with parathyroid-hormone related peptide production associated with squamous cell carcinoma (non-metastatic manifestation of malignancy).

106- A 60-year-old man with breathlessness, fever and headache is suspected of having Farmers Lung. A CXR shows diffuse nodular shadowing predominantly in the mid and lower zones. What would be the most useful diagnostic test?

- 1) Blood Culture [0]
- 2) Sputum Culture [0]
- 3) Serum precipitating antibodies to *Micropolyspora faeni* [100]
- 4) Serum Precipitating antibodies to *Aspergillus clavatus* [0]
- 5) Serum Precipitating antibodies to *Cryptostroma corticale* [0]

The diagnosis of Extrinsic Allergic Alveolitis is based on characteristic clinical, radiological and functional changes and confirmed by demonstration of precipitating antibodies (precipitins) in the patients serum to the causal antigen. In Farmers lung precipitins to *M. faeni* or *Thermoactinomyces vulgaris* are found in 75-100% of cases during an acute episode. *A. clavatus* is the antigen causing Malt Workers lung and *C. corticale* the antigen causing Maple Bark Strippers Lung.

107- A 43-year-old asthmatic develops worsening breathlessness and his full blood count has revealed an eosinophilia. Which of the following statements is true with allergic bronchopulmonary aspergillosis that the patient is likely to suffer from?

- 1) The immediate skin test to an extract of *aspergillus fumigatus* is negative [0]
- 2) Circulating IgG precipitins to *aspergillus fumigatus* are positive [100]
- 3) The CO transfer factor is unaffected [0]
- 4) Recurrent haemoptysis is a characteristic feature [0]
- 5) Pleural effusion is a complication [0]

Immediate (type I) reactions occur in virtually all patients with ABPA following intradermal injections of *A. fumigatus* extracts, with only 16% developing delayed (type III) reactions. Precipitating IgG antibodies are present in 70% of patients. Transfer factor may be affected in the later fibrotic stage of the disease. Haemoptysis is symptom of aspergilloma and bronchiectasis, but is not characteristic of ABPA.

108- A 35-year-old man presents after 3 months of chronic cough with purulent sputum and shortness of breath on exertion. He gives a history of at least two sinus or bronchial infections per year requiring treatment with antibiotics. He also says he and his wife have been unable to have children. He smokes 15 cigarettes per day. Examination is normal except for some wheezing and an area of focal crackles at the left lung base. Chest X-ray shows patchy infiltrates at both bases.

Investigations revealed

FEV1 2.0 L

FVC 2.7 L
pH 7.38
PaCO₂ 40 mmHg
PaO₂ 82 mmHg

What is the most likely diagnosis?

- 1) alpha-1-Antitrypsin (Antiprotease) deficiency [0]
- 2) Asthma [0]
- 3) Cystic fibrosis [0]
- 4) Hypogammaglobulinemia [0]
- 5) Immotile cilia syndrome [100]

Immotile Cilia Syndrome, also known as Primary Ciliary Dyskinesia and includes Kartegener's Syndrome, is an inherited condition where the cilia lining the airways fail to function or function ineffectively. A defect in the dynein molecule causes the cilia to either totally cease to function or function ineffectively. Kartegener's Syndrome is a subset of patients that account for about half of all people with Immotile Cilia Syndrome. Other associated conditions of Immotile Cilia Syndrome are male infertility, congenital heart defects, deafness, and hydrocephalus. Cystic fibrosis is unlikely to present at this age. Infertility is not typically associated with hypogammaglobulinaemia.

109- An 18 year old attending the A+E department is noted to have central cyanosis. She is perfectly well but was told to go to A+E by her friends who said she looked blue. What is the most likely cause?

- 1) Carbon Monoxide Poisoning [0]
- 2) Lead Poisoning [0]
- 3) Drinking water contaminated with nitrates [100]
- 4) Anorexia Nervosa [0]
- 5) Severe Anaemia [0]

This is typical of methaemoglobinaemia which may be caused by nitrates.

Rheumatology

1- A 74-year-old man has had increasingly severe, throbbing headaches for several months, centered on the right. There is a palpable tender cord-like area over his right temple. His heart rate is regular with no murmurs, gallops, or rubs. Pulses are equal and full in all extremities, BP is 110/85 mmHg. A biopsy of this lesion is obtained, and histologic examination reveals a muscular artery with luminal narrowing and medial inflammation with lymphocytes, macrophages, and occasional giant cells. He improves with a course of high-dose corticosteroid therapy. Which of the following laboratory test findings is most likely to be present with this disease?

- 1) Anti-double stranded DNA titer of 1:1024 [0]
- 2) Erythrocyte sedimentation rate of 110 mm/hr [100]
- 3) HDL cholesterol of 0.6 mmol/L [0]
- 4) pANCA titer of 1:160 [0]
- 5) Rheumatoid factor titer of 80 IU/mL [0]

These are classic findings for temporal arteritis, the most typical involvement with giant cell arteritis. Corticosteroid therapy typically produces a reduction of symptoms. Not treating this condition puts the patient at risk for involvement of other branches of the external carotid artery, the worst of which would be the ophthalmic branch.

2- Which of the following is a recognised feature of psoriasis?

- 1) Angular stomatitis [0]
- 2) Iridocyclitis [0]
- 3) Koebner Phenomenon [100]
- 4) Loss of hair [0]
- 5) Response to chloroquine [0]

Psoriasis is associated with a dermatopathy and arthropathy which may be range from mild distal Interphalangeal joint involvement with nail pitting to severe Arthritis Mutilans. A Koebner Phenomenon refers to outbreak of a skin eruption following minor trauma and is a feature of psoriasis. Psoriatic arthropathy may be associated with an anterior uveitis. Chloroquine may produce a severe attack of psoriasis.

3- A 50 year old woman presents with dry eyes, a dry mouth, an erythematous rash and polyarthralgia. Investigations: ANA strongly positive (1:1600), anti-Ro/SSA antibodies strongly positive, rheumatoid factor positive, IgG markedly elevated at 45 g/l (normal - <15 g/l), IgM and IgA levels are normal and the kappa/lambda ratio is normal. What is the most likely diagnosis?

- 1) Hyperviscosity syndrome [0]
- 2) Myeloma associated vasculitis [0]
- 3) Primary Sjogren's Syndrome [100]
- 4) Rheumatoid arthritis with secondary Sjogren's Syndrome [0]
- 5) Systemic Lupus Erythematosus [0]

The clinical features and the serology are typical of primary Sjögren's Syndrome. Hypergammaglobulinaemia is present in 80% of individuals. ANA and Anti-Ro/SSA antibodies are present in approximately 90% of individuals as is a weakly positive rheumatoid factor. The normal kappa/lambda ratio confirms the hypergammaglobulinaemia is polyclonal.

4- A 25 year old lady with known SLE presents with the nephrotic syndrome. A renal biopsy is performed and this confirms diffuse proliferative glomeronephritis (WHO Class 1V). Which of the following treatment regimes would you advise?

- 1) Azathioprine alone [0]
- 2) Prednisolone alone [0]
- 3) Azathioprine and Prednisolone [0]
- 4) Prednisolone and intravenous Cyclophosphamide [100]
- 5) Prednisolone and Methotrexate [0]

Diffuse proliferative glomerulonephritis (WHO CLASS IV) is the commonest GN in SLE. It also carries the worst prognosis for progression to renal failure. Large trials

have confirmed the efficacy of Cyclophosphamide. The usual regime would include high dose steroids and pulses of intravenous Cyclophosphamide, initially given monthly for 6 months and then quarterly. Pulsed intravenous Cyclophosphamide appears to be as effective as oral Cyclophosphamide but has lower toxicity.

5- A 50 year old Asian lady with severe rheumatoid arthritis has failed on most traditional DMARD treatments. She is currently on Methotrexate 20 mg weekly and for the last 6 months has been receiving regular infusions of the anti-TNF-alpha monoclonal antibody, Infliximab. Her joint disease has dramatically improved. She now presents with fevers, pleuritic chest pain and a large left sided pleural effusion, but little evidence of joint synovitis. What is the most likely diagnosis?

- 1) Primary bronchial carcinoma [0]
- 2) Pulmonary metastases [0]
- 3) Pulmonary embolus [0]
- 4) Rheumatoid related effusion [0]
- 5) Tuberculosis [100]

The most likely answer is TB. All of the other answers are possible and need to be excluded. A rheumatoid effusion is unlikely when peripheral joint disease is so well controlled. Treatment with anti-TNF-alpha increases the risk of opportunistic infections and in particular, there is a significant increase in the risk of TB reactivation in conjunction with Infliximab.

6- A 35-year old woman who was two months postpartum presented with a four-week history of joint pain, skin rash and fever. The ESR was 40 mm / hour.

What is the most likely diagnosis?

- 1) reactive arthritis [0]
- 2) rheumatoid arthritis [0]
- 3) sarcoidosis [0]
- 4) systemic lupus erythematosus [100]
- 5) Viral arthritis [0]

This is a poor question. The symptoms are non-specific and to answer one needs to know the nature and distribution of the rash and the severity and pattern of the fever. SLE is the most likely to give a combination of joint pains, rash and fever. Documented persistent or recurrent fevers are not generally a feature of the other conditions. The fact that the patient is 2 months postpartum is irrelevant.

7- A 27 year old man presents with fever, urethritis and arthralgia. He is found to have a swollen ankle with a pustular rash on the dorsal aspect of his foot.

What is the most likely diagnosis?

- 1) Gonococcal sepsis [100]
- 2) Lyme disease [0]
- 3) Reiter's syndrome [0]
- 4) Staphylococcal arthritis [0]
- 5) Tuberculous arthritis [0]

The most likely cause for this acute presentation is gonococcal septicaemia - with a pustular rash on the dorsum of his foot, fever, urethritis and oligoarthritis. Reiter's is associated with an acute infection – urethritis/diarrhoea and later the development of an arthritis.

8- A study has been designed to investigate whether a certain drug plus physiotherapy treatment is better than drug treatment alone in the management of rheumatoid arthritis. After randomizing the patients a small proportion of the drug plus physiotherapy group decide to drop out of the study or omit some treatment sessions specified in the research protocol. What is the correct way of analysing the subsequent data?

- 1) Assume the patients have withdrawn their consent [0]
- 2) Exclude these patients from all analysis [0]
- 3) Extend the trial recruitment to make up the numbers [0]
- 4) Include these patient outcomes in the drug plus physiotherapy group [100]
- 5) Interview the patients and report their group separately [0]

This is the principle of 'intention to treat'. It is possible that the physiotherapy intervention was harmful to the patients and this is why they left. Intention to treat helps to reduce bias by sticking to the original allocation of treatment and analyzing the patient in that treatment group even (and concentrate for this bit) even if they don't get it!

9- Which of the following is associated with Hyperuricaemia?

- 1) is usually due to an excess purine consumption [0]
- 2) occurs in association with acute lymphoblastic leukaemia [100]
- 3) in primary gout is inherited in an autosomal dominant manner [0]
- 4) can be reduced with low dose aspirin therapy [0]
- 5) can be treated with uricosuric drugs even in renal failure [0]

Hyperuricaemia may be due to increased purine intake, urate production or reduced urate clearance, and is most commonly due to the latter. Therefore it can occur in association with enhanced cell destruction particularly leukaemias. Primary gout has no obvious mode of inheritance, but familial juvenile gouty nephropathy is an autosomal dominantly inherited disorder. Low dose aspirin may exacerbate gout but high dose aspirin is uricosuric. Many of the uricosuric drugs may be detrimental in renal failure and may not be effective.

10- A 45-year-old man has noted pain in his right knee for several years. There is no joint swelling. As he moves about during the day, the pain decreases.

The underlying disease process is probably which of the following?

- 1) Osteoarthritis [100]
- 2) Osteochondroma [0]
- 3) Osteomalacia [0]
- 4) Osteopetrosis [0]

5) Osteoporosis [0]

Osteoarthritis usually involves a larger joint. The pain usually diminishes with movement, but recurs with reuse or prolonged use of the affected joint. Osteoporosis would be uncommon in a 45-year-old male. Back pain is a more typical symptom for osteoporosis. Osteochondroma could be located about the knee, but the pain would probably be exacerbated by movement or local trauma. The findings with osteomalacia would be similar to osteoporosis, and back pain would be more typical. Osteopetrosis, an uncommon inherited metabolic disorder, leads to 'brittle bones' that predispose to fractures.

11- A 55-year-old woman on treatment for long-standing rheumatoid arthritis has recently become dyspnoeic on mild exertion and developed a dry cough. The oxygen saturation was found to be 87% on air. The chest x-ray showed a diffuse bilateral interstitial infiltrate. An extensive infection screen was negative and her symptoms were felt to be drug-induced.

Which drug is most likely to have caused this adverse effect?

- 1) azathioprine [0]
- 2) cyclosporin [0]
- 3) hydroxychloroquine [0]
- 4) methotrexate [100]
- 5) sulphasalazine [0]

Methotrexate is a well recognised cause of acute pneumonitis and interstitial lung disease. It is a rare complication of methotrexate therapy but is often fulminant and can be fatal.

12- A 40 year old man presents with acute monoarthritis of the right knee. Gout is confirmed following joint aspiration and examination of the fluid under polarised light microscopy. He underwent endoscopy 3 weeks earlier because of dyspepsia and this confirmed a duodenal ulcer. Which of the following would be the best initial treatment for him?

- 1) Allopurinol [0]
- 2) Indomethacin alone [0]
- 3) Indomethacin and Lansoprazole [0]
- 4) Indomethacin and Misoprostol [0]
- 5) Intra-articular corticosteroid injection [100]

All non-steroidals including Cox-II selective non-steroidals are contra-indicated in the presence of active ulceration. Allopurinol should never be started in the presence of acute gout as the symptoms will be exacerbated. In a large joint such as the knee, the safest option would be to inject corticosteroid into the joint. Colchicine would also be an option but is associated with GI toxicity.

13- A young woman has acne and is taking oral medication. She develops polyarthritis and raised liver enzyme tests. Investigations show

AST 95

ALT 170

bilirubin 16

antinuclear antibodies strongly positive at 1/640, negative at 1/20

Which of the following drugs is she most likely to have been prescribed?

- 1) erythromycin [0]
- 2) isotretinoin [0]
- 3) minocycline [100]
- 4) oxytetracycline [0]
- 5) trimethoprim [0]

Except trimethoprim all other drugs are used in the treatment of acne. And all of these can cause hepatotoxicity. Erythromycin usually causes cholestasis. Minocycline can cause drug induced SLE.

14- A 28 year old man presented with acute stiffness and swelling of his knees and ankles, and a painful rash on his legs. The ESR was 86 mm in the first hour. Chest X-ray showed hilar lymphadenopathy.

What is the most likely outcome?

- 1) chronic arthritis [0]
- 2) pulmonary fibrosis [0]
- 3) renal failure [0]
- 4) skin ulceration [0]
- 5) spontaneous improvement [100]

The description is typical of acute sarcoidosis with erythema nodosum, oligoarthropathy and hilar lymphadenopathy. This has a good prognosis and usually resolves spontaneously over 6-8 weeks.

15- A 70 year old man complains of pain and stiffness in both his shoulders. He has lost 1 stone in last 8 weeks and complains of feeling lethargic with loss of appetite. Investigations revealed a very high ESR (100 mm/hr), normochromic normocytic anaemia and a positive rheumatoid factor. The most likely diagnosis is:

- 1) Polyarteritis nodosa [0]
- 2) Polymyalgia Rheumatica [100]
- 3) Polymyositis [0]
- 4) Rheumatoid Arthritis [0]
- 5) SLE [0]

This condition is polymyalgia Rheumatica. It is associated with weight loss, anemia and malaise. It is associated with false positive rheumatoid factor especially in the elderly. Positive rheumatoid factor does not make a diagnosis of rheumatoid arthritis.

16- A 70-year-old man from Lancashire has noted increasing back and leg pain for several years. X-rays reveal bony sclerosis of the sacroiliac, lower vertebral, and upper tibial regions with cortical thickening, but without mass effect or significant bony destruction.

He also says his hat does not fit him anymore. He has greater difficulty hearing on the left. He has orthopnea and pedal edema.

Blood tests reveal an elevated serum alkaline phosphatase.

The most likely pathologic process that explains these findings is?

- 1) Decreased bone mass [0]
- 2) Metastatic adenocarcinoma [0]
- 3) Paget's disease of bone [100]
- 4) Renal failure with renal osteodystrophy [0]
- 5) Vitamin D deficiency [0]

This man has Paget's disease with high output cardiac failure and sensorineural deafness.

Renal osteodystrophy leads to lesions of osteitis fibrosa cystica admixed with osteomalacia, which are focal in nature. Metastatic disease to bone produces focal lesions, not more diffuse enlargement.

17- Which one of the following drugs works by inhibiting the tumour necrosis factor?

- 1) cyclosporin [0]
- 2) infliximab [100]
- 3) methotrexate [0]
- 4) montelukast [0]
- 5) sulphasalazine [0]

Montelukast works as leukotriene receptor antagonists, and is used in treatment of asthma. Etanercept and infliximab inhibit TNF and are licensed in the treatment of rheumatoid arthritis. Infliximab is given with methotrexate and is associated with development of tuberculosis.

18- A 32 year old, previously well, female presents with a seven month history of pain and stiffness in her joints. Examination reveals synovitis of the distal interphalangeal joints of the left index finger and the right ring finger together with the left wrist and left ankle joints. The ESR was 35mm in the first hour. Which one of the following is the most likely diagnosis?

- 1) Osteoarthritis [0]
 - 2) Psoriatic arthritis [100]
 - 3) Rheumatoid arthritis [0]
 - 4) Systemic lupus erythematosus. [0]
 - 5) Viral arthritis. [0]
-

The lengthy history with an oligoarticular involvement but affecting the distal interphalangeal joints despite the lack of any previous history of psoriasis is suggestive of psoriatic arthropathy. The synovitis would argue against a diagnosis of OA and the absence of any other supportive features (rash) makes SLE unlikely. One would expect a more symmetrical arthropathy with RhA and it has progressed may beyond the acute period expected for a viral arthritis.

19- A female presents with headache, lethargy and weight loss. Which of the following would make the diagnosis of giant cell arteritis unlikely?

- 1) A normal ESR [0]
- 2) Bilateral headache [0]
- 3) Non-tender temporal arteries [0]
- 4) Papilloedema on fundoscopy [100]
- 5) The patient is 50 years old [0]

Patients are usually elderly with a typical age of 70 but not exclusively so. The temporal arteries are usually tender but they may be non-tender. Similarly there is usually a unilateral headache but often presents as bilateral headache. ESR is typically elevated but a normal ESR is well recognised. However, papilloedema would suggest an alternative diagnosis.

20 -A 73 year old male presented with an acute attack of gout in his left knee. What is the most likely underlying metabolic cause?

- 1) decreased renal excretion of uric acid [100]
- 2) endogenous overproduction of uric acid [0]
- 3) excessive dietary purine intake [0]
- 4) lactic acidosis [0]
- 5) starvation [0]

The aetiology of gout can broadly be divided into cases where there is underexcretion of urate via the kidney (90%) or endogenous overproduction of uric acid (10%) although in practical terms the distinction is rarely made as it allopurinol is the mainstay of long-term treatment (not during the acute attack!) in both groups. In a 73 year old man it is almost certainly reduced renal excretion due to deteriorating renal function and possibly diuretic use. Excessive dietary intake of purines is unlikely to be the main cause in this case.

21- A 30 year old woman presented with a deep vein thrombosis. Her previous history included investigation for infertility. Investigations revealed: Haemoglobin 12.8 g/dl (12.5-16.5) White cell count $3.6 \times 10^9/L$ (4-11) Platelet count $35 \times 10^9/L$ (150-400) Select one of the following investigations that is most likely to be abnormal?

- 1) Antiphospholipid antibodies. [100]
 - 2) Homocystine concentration [0]
 - 3) Platelet function test [0]
 - 4) Protein C concentration. [0]
 - 5) Indium-labelled white cell scan. [0]
-

The suggestion is that this patient has a thrombophilia, with a low platelet and white cell count. Together with the infertility a diagnosis of antiphospholipid syndrome is suggested. Although protein C deficiency is associated with thrombophilia, infertility is not a feature nor is thrombocytopaenia/leucopaenia. Hyperhomocystinaemia is associated with arterial thrombosis.

22- A 41-year-old African man has a history of multiple episodes of sudden onset of severe abdominal pain and back pain lasting for hours. Each time this happens, his peripheral blood smear demonstrates numerous sickled erythrocytes.

A haemoglobin electrophoresis shows 94% Hgb S, 5% Hgb F, and 1% Hgb A2. He now has increasing pain in his right groin radiating to the anterior aspect of the thigh and to the knee. His temperature was 38°C and examination of his hip revealed pain on internal rotation. A radiograph reveals irregular bony destruction of the femoral head.

The most likely organism to be responsible for these findings is?

- 1) *Candida albicans* [0]
- 2) *Clostridium perfringens* [0]
- 3) Group B streptococcus [0]
- 4) *Salmonella* species [100]
- 5) *Yersinia pestis* [0]

Salmonella osteomyelitis is seen in patients with sickle cell anemia. Other organisms that are frequent causes for osteomyelitis with sickle cell anemia include *Staphylococcus aureus* and gram negatives such as *Klebsiella*.

23- An otherwise healthy middle-aged man with no prior medical history has had increasing back pain and right hip pain for the past 10 years. The pain is worse at the end of the day. He has bony enlargement of the distal interphalangeal joints. A radiograph of the spine reveals the presence of prominent osteophytes involving the vertebral bodies. There is sclerosis with narrowing of the joint space at the right acetabulum seen on a radiograph of the pelvis.

Which of the following pathologic processes is most likely to be taking place in this patient?

- 1) Gout [0]
- 2) Lyme disease [0]
- 3) Osteoarthritis [100]
- 4) Osteomyelitis [0]
- 5) Rheumatoid arthritis [0]

Degenerative osteoarthritis is a common and progressive condition that becomes more frequent and symptomatic with aging. There is erosion and loss of articular cartilage. Rheumatoid arthritis typically involves small joints of the hands and feet most severely, and there is a destructive pannus that leads to marked joint deformity. A gouty arthritis is more likely to be accompanied by swelling, and deformity with joint destruction. The pain is not related to usage. Osteomyelitis represents an ongoing

infection that produces marked bone deformity, not just joint narrowing. Lyme disease produces a chronic arthritis, but it is typically preceded by a deer tick bite with a skin lesion. It is much less common than osteoarthritis.

24- An 85 year old woman presented with bilateral osteoarthritis of the knees. She had no history of previous gastrointestinal disease. Which of the following is the most appropriate initial treatment for her?

- 1) Celecoxib [0]
- 2) Naproxen [0]
- 3) Dihydrocodeine [0]
- 4) Paracetamol [100]
- 5) Topical diclofenac. [0]

The recommendations of the American College of Rheumatology published in Arthritis and Rheumatism 2000, recommend acetaminophen (paracetamol) together with non-pharmacological interventions (exercise, diet) as first line therapy of mild/moderate OA of hips or knees.

25- A 65 year old man complains of bone pain especially in his spine. X-ray revealed lytic lesions in the vertebrae and skull. He also had anemia and hypercalcaemia. Which of the following is least likely to be present in this patient:

- 1) Bence Jones proteins [0]
- 2) Decreased resistance to infection [0]
- 3) Infiltration of flat bones by plasma cells [0]
- 4) Macroglobulinemia [100]
- 5) Monoclonal gammopathy [0]

This is multiple myeloma. Macroglobulinemia is not typical of multiple myeloma.

26- A 62-year-old man has back pain. An FBC shows a WBC count of $3.7 \times 10^9/L$ (4 - 11), hemoglobin 10.3 g/dL (14 - 18), MCV 85 fL, and platelet count $110 \times 10^9/L$ (150 - 400). His total serum protein is 85 g/l with an albumin of 41 g/l. A chest X-ray shows no abnormalities of heart or lung fields, but there are several lucencies in the vertebral bodies. You perform a sternal bone marrow aspirate and get a dark red jelly-like material in the syringe. The smear of the aspirate is most likely to show which of the following cell types as a prominent feature?

- 1) Fibroblasts [0]
- 2) Giant cells [0]
- 3) Metastatic renal cell carcinoma cells [0]
- 4) Osteoblasts [0]
- 5) Plasma cells [100]

The patient has multiple myeloma. The bone marrow needle was in a lytic lesion filled with plasma cells. His serum globulin is high from a monoclonal gammopathy. Osteoblasts are most numerous in repair of bone, and callus is very firm. Fibroblasts produce collagen and are more numerous with the gross appearance of firm, white scar tissue. Giant cells may be seen in a variety of benign and malignant lesions of

bone, but this does not explain the hypergammaglobulinemia. Osteolytic metastases of renal cell carcinoma could have the gross appearance described here, but would not account for hypergammaglobulinemia.

27- A 62-year-old lady is suffering from pain and stiffness of her shoulders and difficulty getting out of a chair. Which of the following would support a diagnosis of polymyalgia rheumatica?

- 1) ankle stiffness [0]
- 2) low grade fever [100]
- 3) muscle tenderness [0]
- 4) proximal muscle weakness [0]
- 5) weight gain [0]

Polymyalgia rheumatica presents with early morning stiffness of the shoulder and pelvic girdles, fever, anorexia, weight loss and malaise. There is no muscle tenderness or weakness and the feet are never affected. Investigations may reveal normochromic / normocytic anaemia, raised ESR often > 50 mm/hr, raised ALP and raised CRP. Features of Giant Cell arteritis should be sought - headache, visual disturbance, TIAs, jaw claudication and thickened, tender, pulseless temporal arteries. Diagnosis is by temporal artery biopsy and / or characteristic response to steroids.

28- Which of the following is a recognised feature of polymyalgia rheumatica:

- 1) weakness of distal muscle groups [0]
- 2) elevated serum creatine phosphokinase activity [0]
- 3) an association with bronchial carcinoma [0]
- 4) weight loss [100]
- 5) a peak incidence in the fourth decade of life [0]

a-stiffness weakness is more typical of polymyositis b-would suggest polymyositis d-typical e-later in life

29- A 55 year old female undergoes a DEXA scan which reveals a bone mineral density T score of -2.5 at the hip and lumbar spine. Which of the following may contribute to such a result?

- 1) Acromegaly [0]
- 2) Delayed menopause [0]
- 3) Hypothyroidism [0]
- 4) Myeloma [100]
- 5) Obesity [0]

This patient has osteoporosis as defined by her abnormally low T score. Endocrine diseases associated with osteoporosis are Cushing's disease, vitamin D deficiency, thyrotoxicosis and hypogonadism. Myeloma and lymphoma are also associated with reduced BMD. Other associates include rheumatoid arthritis, renal failure, corticosteroids, early menopause, slender habitus, smoking, lack of exercise, family history, age/sex and excess alcohol.

30- Which of the following may be responsible for an acute relapse of Systemic Lupus Erythematosus in a 38 year old female?

- 1) hydralazine therapy [0]
- 2) Pregnancy [100]
- 3) Progesterone only contraceptive pill [0]
- 4) Salmeterol therapy [0]
- 5) Winter holiday in Lapland [0]

Some physiological and environmental factors affect the periods of deterioration and of remission in systemic lupus erythematosus. These factors include HRT and particularly the oral contraceptive, pregnancy and infection. It would not be expected with the progesterone only oral contraceptive. You would expect to find virtually no sun on a winter holiday in Lapland (Arctic Circle)! A number of drugs (hydralazine, procainamide, isoniazid, chlorpromazine, D-penicillamine and methyldopa) can result in drug-induced lupus in predisposed individuals. This can be differentiated from the idiopathic SLE on genetic and immunologic grounds. Furthermore, it is mild and reversible on stopping the drug, renal disease and double stranded anti-DNA are rare (although antibodies specific for histones may be present) and the sex ratio is equal. They do not cause deterioration in patients with SLE.

31- 25 year old lady gives birth to a baby with complete heart block who subsequently requires pacemaker insertion. Which of the following antibodies is most likely to be detected in the maternal serum?

- 1) Anti-dsDNA antibodies [0]
- 2) Anti-endomysial antibodies [0]
- 3) Anti-Ro/SSA antibodies [100]
- 4) Anti-SCL70 antibodies [0]
- 5) Rheumatoid factor [0]

The majority of cases of congenital heart block are due to the presence of anti-Ro/SSA antibodies in the maternal serum. The mother may have no evidence of a connective tissue disorder. The risks of congenital heart block in mothers with anti-Ro/SSA antibodies remains very small (<3%) but the correlation between the presence of anti-Ro/SSA antibodies and congenital heart block is very strong. The heart block is generally permanent (unlike other features of neonatal lupus) and insertion of a permanent pacemaker is frequently required.

32- A 51-year-old female is referred by her GP over concerns about osteoporosis. She had a hysterectomy and oophorectomy because of uterine fibroids one year ago, after which she developed hot flushes that now have stopped. Her elderly mother recently fractured the neck of her femur and the patient is worried about the possibility that she too will fracture her hip later in life.

She is otherwise well, is a non-smoker drinks about 5 units of alcohol weekly and has a healthy diet.

Examination reveals a fit thin female with a BMI of 18, her blood pressure is 122/88mmHg and breast examination is normal.

Which of the following would you recommend for her?

- 1) Bisphosphonates [0]
- 2) Calcitonin [0]
- 3) Combined Oestrogen and progesterone therapy [0]
- 4) Unopposed Oestrogen therapy [100]
- 5) Vitamin D [0]

This patient has a risk for osteoporosis being thin and recently having had Oophrectomy. Department of Health guidelines would support the use of Oestrogen replacement as first-line therapy in such patients. Unopposed oestrogen therapy is most appropriate as the patient has had a hysterectomy and combined HRT is unnecessary. Tibolone, Raloxifene and Bisphosphonates are recommended as second line agents where HRT may be poorly tolerated or contra-indicated.

<http://www.doh.gov.uk/osteop.htm>

33- A man in his 20's begins to note persistent lower back pain and stiffness that diminishes with activity. In his 30's he also develops hip and shoulder arthritis, and in his 40's he is bothered by decreased lumbar spine mobility. He has no other major medical problems.

These findings are most typical for which of the following?

- 1) Ankylosing spondylitis [100]
- 2) Calcium pyrophosphate dihydrate deposition disease [0]
- 3) Lyme disease [0]
- 4) Osteoarthritis [0]
- 5) Rheumatoid arthritis [0]

He probably is also HLA B27 positive. The earlier in life the disease begins, the worse the prognosis. There is a progressive bony ankylosis, especially of spine. RA typically involves small joints. Osteoarthritis typically involves a single large joint. Calcium pyrophosphate dihydrate deposition disease (Pseudogout) is more typical of the elderly and occurs in acute attacks.

34- A 50 year old man presents with a 6 week history of general malaise and a 2 day history of a right foot drop, a left ulnar nerve palsy and a widespread purpuric rash. He complains of arthralgia but has no clinical evidence of inflammatory joint disease. Echocardiogram is normal, blood cultures are negative, ESR 100 mm/hr, ANCA negative, ANA negative, rheumatoid factor strongly positive, C3 0.8 g/l (0.75 - 1.6), C4 0.02 g/l (0.14 - 0.5). Dipstick urinalysis shows blood ++ but no protein.

- 1) ANA negative SLE [0]
- 2) Cryoglobulinaemia [100]
- 3) Infective endocarditis [0]
- 4) Polyarthritidis nodosa [0]
- 5) Rheumatoid arthritis [0]

The history is strongly suggestive of systemic vasculitis with mononeuritis multiplex, purpuric rash and haematuria. It is important to exclude conditions which can mimic

vasculitis such as infective endocarditis. The normal echocardiogram and negative blood cultures make this unlikely. Whilst polyarthritis nodosa can present with exactly this clinical picture, the marked consumption of C4 together with a strongly positive rheumatoid factor strongly suggests cryoglobulinaemia. Which of the following is a pro-inflammatory cytokine?

- 1) C-Reactive Protein [0]
- 2) IL-4 [0]
- 3) IL-10 [0]
- 4) Serum amyloid precursor protein [0]
- 5) Tumour Necrosis Factor – alpha [100]

C-Reactive Protein and Serum Amyloid Precursor protein are acute phase reactants. IL-4 and IL-10 are anti-inflammatory cytokines. TNF-alpha is a pro-inflammatory cytokine. In inflammatory disorders such as rheumatoid arthritis, the levels of TNF-alpha are markedly elevated in inflamed joints. Treatments directed at the inhibition of TNF-alpha such as Infliximab (a monoclonal antibody against TNF-alpha) have been shown to be very effective in the treatment of rheumatoid arthritis and also effective in fistulating Crohn's disease.

38- as the underlying cause. Cryoglobulins are immunoglobulins which precipitate in the cold. They can be type I (monoclonal), type II (mixed monoclonal and polyclonal), or type III (polyclonal). Type I cryoglobulinaemia is associated with haematological diseases such as myeloma and Waldenstrom's. Type II and Type III cryoglobulinaemia can be associated with many connective tissue disorders, chronic infections and most importantly, hepatitis C infection which should always be excluded. Treatment of cryoglobulinaemia would include plasmapheresis, high dose steroids and Cyclophosphamide

35- Which of the following statements is true of the immunology of rheumatoid arthritis?

- 1) It is an example of an organ-specific disease. [0]
- 2) Joint damage is the consequence of mast cell degranulation. [0]
- 3) It is likely that joint specific Antigens have been sequestered during the time when immunological tolerance was being established. [0]
- 4) Rheumatoid factor is detected by a test utilising the patients B lymphocytes. [0]
- 5) Rheumatoid factor is an antibody with reactivity to the heavy chain of IgG. [100]

Rheumatoid arthritis is associated with several antibodies such as rheumatoid factor, collagen antibody, capable of reaction at sites other than the joints. Additionally, the disease is not confined to the joints. Damage is mediated by several means, including macrophages activated by CD4+ T cells, and by complement fixing immune complexes. There is no evidence for the creation of joint-specific antibodies in development. All the components of the joint are present during fetal life. The Rheumatoid factor test utilizes the patient's serum, to agglutinate cells coated with antibody. Rheumatoid factor (RF) is an antibody whose specificity is directed to a domain situated within the Fc portion of IgG. The rheumatoid factor may be of IgM, IgG or IgA class. The conventional (agglutination) test, detects only IgM RF.

36- Bone densitometry performed on a 48-year-old woman demonstrates bone mass decreased more than 2 standard deviations below the mean for her age in her left femoral head, wrist, and lumbar vertebral region.

Six months later, the amount of bone loss is seen to be increased by repeat densitometry examination.

These findings are most likely to be associated with which of the following serum laboratory test abnormalities?

- 1) Intact parathormone of 5 pmol/L (1.2 - 5.8) [0]
- 2) Cortisol of 2060 nmol/L (110 - 607) [100]
- 3) Total serum globulin of 35 g/L [0]
- 4) Uric acid of 930 micromol/L (149 - 446) [0]
- 5) Total cholesterol of 10 mmol/L (< 5.17) [0]

She has osteoporosis with decreased bone mass. Most cases do not have a specific etiology, but Cushing's syndrome with hypercortisolism can promote osteoporosis. Her age should make you suspicious. Hypoparathyroidism is not going to accelerate bone loss. The bone resorption that accompanies hyperparathyroidism can cause osteoporosis. Over 95% of cases of osteoporosis are 'primary' with unknown cause. Elevated serum globulin should make you suspect a monoclonal gammopathy, but myeloma leads to focal bone lytic lesions. Hyperuricemia can be associated with gout that can cause focal bone destruction near affected joints, the bone mass overall is not decreased.

37- Which of the following is a pro-inflammatory cytokine?

- 1) C-Reactive Protein [0]
- 2) IL-4 [0]
- 3) IL-10 [0]
- 4) Serum amyloid precursor protein [0]
- 5) Tumour Necrosis Factor – alpha [100]

C-Reactive Protein and Serum Amyloid Precursor protein are acute phase reactants. IL-4 and IL-10 are anti-inflammatory cytokines. TNF-alpha is a pro-inflammatory cytokine. In inflammatory disorders such as rheumatoid arthritis, the levels of TNF-alpha are markedly elevated in inflamed joints. Treatments directed at the inhibition of TNF-alpha such as Infliximab (a monoclonal antibody against TNF-alpha) have been shown to be very effective in the treatment of rheumatoid arthritis and also effective in fistulating Crohn's disease.

38- Which of the following drugs is most likely to cause systemic lupus-like syndrome?

- 1) baclofen [0]
- 2) isoniazid [0]
- 3) methotrexate [0]
- 4) procainamide [100]
- 5) sulphasalazine [0]

A recessive gene is responsible for activity of hepatic N-acetyl transferase resulting in slow or fast (intermediate and fast groups get lumped together). 45% UK population are slow acetylators. Drugs affected include isoniazid, hydralazine, dapsone, procainamide and sulphasalazine. Slow acetylators have increased risk of isoniazid-induced peripheral neuropathy, and hydralazine or procainamide-induced SLE. Fast acetylators are at more risk of isoniazid-induced hepatitis.

39- Which of the following statements regarding systemic lupus erythematosus (SLE) is correct?

- 1) when disease is active the levels of complements C3 and C4 are raised. [0]
- 2) when evidence of mild nephritis is present, a renal biopsy is unnecessary. [0]
- 3) there is a female preponderance of 8:1. [0]
- 4) first manifestation of the disease may be idiopathic thrombocytopenia purpura. [100]
- 5) there is neurological involvement in about 10% of cases. [0]

When SLE is active the serum complement is depressed. C3 and C4 levels can be used to monitor response to treatment. A poor correlation exists between the clinical manifestations and severity of renal involvement. A biopsy is essential in guiding treatment when renal involvement exists. Neurological involvement is common in SLE. Nearly 50% have neurological problems including: personality disorder, seizures, cardiovascular accidents, and a peripheral neuritis (mononeuritis multiplex). From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 57 © WB Saunders. Reproduced with permission.

40- A 75-year-old man has persistent back pain for several months that is unrelated to physical activity. He has lost 12 kg in weight during this time.

Laboratory findings include a White cell count of $6.7 \times 10^9/\text{L}$ with a differential of 70 segs, 8 bands, 2 metamyelocytes, 15 lymphocytes, 5 monocytes, and 2 nucleated RBCs/100 WBCs. Haemoglobin is 11.2 g/dL, Haematocrit 33.3%, MCV 88 fL, and platelet count $89 \times 10^9/\text{L}$.

The Biochemistry shows a sodium concentration of 144 mmol/L, potassium 4.5 mmol/L, chloride 100 mmol/L, bicarbonate of 26 mmol/L, urea 14 mmol/L, creatinine 90 $\mu\text{mol/L}$, and a glucose of 5.4 mmol/L.

A CT scan of the spine reveals scattered 0.4 to 1.2 cm bright lesions in the vertebral bodies.

Which of the following additional laboratory test findings is he most likely to have?

- 1) Blood culture positive for *Neisseria gonorrhoeae* [0]
- 2) Parathyroid hormone, intact, of 100 pg/mL (normal < 65) [0]
- 3) Positive serology for *Borrelia burgdorferi* [0]
- 4) Serum calcium of 1.4 mmol/L [0]
- 5) Serum prostate specific antigen of 35 microgram/L [100]

A prostatic adenocarcinoma should be the first guess (particularly in a male!) with osteoblastic (bone-forming) tumor metastases. Extensive metastases can act as a myelophthitic process that leads to peripheral blood leukoerythroblastosis. His cancer

may be causing urinary tract obstruction. Hyperparathyroidism should be accompanied by increased bone lucency. Hypocalcemia is not typically related to bone disease. Lyme disease can be associated with an arthritis, but not bone lesions.

41- Which ONE of the following diagnoses is associated with acute Iritis?

- 1) keratoconus [0]
- 2) Lyme disease [0]
- 3) osteogenesis imperfecta [0]
- 4) Psoriatic arthropathy [100]
- 5) Refsum's disease [0]

Iritis is associated with conditions such as Reiter's, Behcet's, Psoriatic arthropathy (about 20%) and inflammatory bowel disease. A chronic iritis is rarely described in association with Lyme disease. Osteogenesis imperfecta is associated with blue sclera. Keratoconus, meaning "cone shaped," describes a condition in which the cornea (the clear front window of the eye) becomes thin and protrudes. This abnormal shape can cause serious distortion of visual images. It is not associated with iritis. Refsum's disease is associated with retinitis pigmentosa.

42- A 52 year old woman presented with a two week history of malaise and lower limb joint pain, associated with a vasculitic rash over her shins, thighs and buttocks.

Investigations revealed:

haemoglobin 9.8 g/dL (11.5 – 16.5)
platelet count 275 X 10⁹/L (150 – 400)
serum creatinine concentration 452 µmol/L (60 – 110)
antinuclear antibodies Negative
antineutrophil cytoplasmic antibodies Negative
antiglomerular basement membrane antibodies Negative
dipstick urinalysis blood+++
protein+

What is the most likely diagnosis?

- 1) amyloidosis [0]
- 2) haemolytic uraemic syndrome [0]
- 3) Henoch-Schonlein nephritis [100]
- 4) membranous nephropathy [0]
- 5) myeloma [0]

The distribution of the rash together with lower limb joint pains and renal involvement are most suggestive of Henoch-Schonlein purpura. This usually occurs in children aged 2-10 years but can occur in any age group. The only way of differentiating this condition from other small vessel vasculitides is by biopsy the hallmark being IgA deposition in vessel walls on direct immunofluorescence. Membranous nephropathy is a histological diagnosis and usually presents with proteinuria only as does amyloidosis. Myeloma can rarely cause vasculitis which is ANCA negative but this is rare and unlikely. HUS causes haemoglobinuria rather than an active renal sediment.

43- A 23 year old female presents with a left knee joint pain and a 2 month history of weight loss. She has a good appetite but has had occasional episodes of diarrhoea over this time and tends to pass a loose motion at least twice daily. She is taking no medication but there is a family history of hypothyroidism. She is a non-smoker and drinks modest quantities of alcohol. Examination reveals a swollen, tender left knee joint with a small effusion. The most likely diagnosis is?

- 1) Behcet's disease [0]
- 2) Reiter's syndrome [0]
- 3) Inflammatory bowel disease [100]
- 4) Tuberculosis [0]
- 5) Thyrotoxicosis [0]

The description of weight loss, diarrhoea and a mono/oligo-arthritis suggests a diagnosis of inflammatory bowel disease. Reiter's is unlikely to present with oligoarthritis and the diarrhoea is usually acute.

44- A 16 year old girl presents with a 3 month history of polyarthralgia and marked early morning stiffness. Her symptoms respond well to Diclofenac but she is becoming increasingly concerned about her symptoms which appear to be progressing. She is otherwise well apart from a history of acne which is well controlled on Minocycline. Her mother has severe rheumatoid arthritis.

Investigations: ESR 50 mm/hr, CRP 100 mg/l, rheumatoid factor negative, ANA strongly positive (1:1600), anti-dsDNA antibodies negative, IgG elevated at 25 g/l (normal<15). What is the most likely cause?

- 1) Systemic Lupus Erythematosus [0]
- 2) Drug-induced SLE [100]
- 3) Fibromyalgia [0]
- 4) Rheumatoid arthritis [0]
- 5) Sero-negative spondyloarthritis [0]

The history strongly suggests an inflammatory problem and the elevated ESR and CRP confirm this. Rheumatoid arthritis and connective tissue disorders such as SLE would be on the differential diagnosis. The serology is atypical for rheumatoid arthritis and the marked elevation of the CRP would be very unusual for SLE where characteristically, CRP elevation indicates underlying bacterial infection or widespread serositis. The most likely diagnosis is drug-induced SLE. Minocycline has been well documented as a cause of drug-induced SLE. Characteristically, the ESR and CRP are both markedly elevated, the ANA is strongly positive and there is a hypergammaglobulinaemia. Anti-dsDNA antibodies are usually negative. Symptoms usually improve following withdrawal of the drug but can take several months to resolve.

45- A 45-year-old woman notices that she develops tingling and numbness over the palmar surface of her thumb, index, and middle fingers after several hours at her computer workstation doing word processing. Pain in the same area often occurs at night as well.

Which of the following pathologic findings accounts for her symptoms?

- 1) Gout [0]

- 2) Hypertrophic osteoarthropathy [0]
- 3) Localized tenosynovitis [100]
- 4) Rheumatoid arthritis [0]
- 5) Toxic peripheral neuropathy [0]

She has carpal tunnel syndrome, an entrapment neuropathy of median nerve. In this lady, tenosynovitis is worsened by repetitive motion i.e. repetitive strain injury.

46- A 20 year old Caucasian lady presents with typical erythema nodosum. She has a low grade fever and bilateral ankle arthritis but no other symptoms and has no medical history. There is no history of travel abroad and she is on no medication.

Which of the following would be the most appropriate investigation for this patient?

- 1) Barium enema [0]
- 2) Chest x-ray [100]
- 3) ESR [0]
- 4) Upper GI endoscopy [0]
- 5) Viral titres [0]

Erythema Nodosum is commonly idiopathic. It can also be related to streptococcal infections, acute sarcoidosis or related to drugs such as the oral contraceptive pill, Sulphonamides and Penicillins. Rarer causes include inflammatory bowel disease, TB, Behçet's Disease and other connective tissue disorders. In this case, a chest x-ray would be the most helpful investigation as this may identify bilateral hilar lymphadenopathy which together with a bilateral ankle arthropathy would strongly support a diagnosis of acute sarcoidosis. Investigation of the bowel is unlikely to help in the absence of any bowel symptoms. Viral titres and ESR are non-specific.

47- A 22 year old boy with known hereditary angioneurotic oedema (HAO) presents with a recurrent fever, arthralgia and a rash on the face and the upper chest. Despite treatment for his HAO, he has always been troubled by recurrent attacks and has required adrenaline on several occasions. His C4 levels have been persistently reduced secondary to his HAO. What is the most likely cause for his current symptoms?

- 1) Dermatomyositis [0]
- 2) Drug rash [0]
- 3) Psoriasis with arthropathy [0]
- 4) Systemic Lupus Erythematosus [100]
- 5) Viral illness [0]

HAO is characterised by deficiency of C1 esterase inhibitor. This leads to persistent activation of the classical complement pathway and C4 levels are frequently low secondary to activation and consumption. If treatment fails to normalise the C4 levels and they remain persistently low, these patients are at an increased risk of developing SLE.

48- A 50 year old man known to be a heavy drinker presents with lethargy, polyuria and pain and stiffness of the hands. He has evidence of an arthropathy affecting the

2nd and 3rd metacarpo-phalangeal joints of both hands with X-ray evidence of degenerative disease at these sites. He also has 5cm hepatomegaly. Which of the following is the most likely diagnosis.

- 1) Gout [0]
- 2) Osteoarthritis [0]
- 3) Rheumatoid arthritis with amyloidosis [0]
- 4) Pyrophosphate arthropathy [0]
- 5) Haemochromatosis [100]

There are several rheumatic manifestations of haemochromatosis. Classically there is a non-inflammatory degenerative arthropathy affecting the 2nd and 3rd MCP joints with hook-like osteophytes on X-ray. These joints are rarely involved in primary osteoarthritis. Other joints can also become involved especially the hips, knees and shoulders and occasionally the joint disease can resemble rheumatoid arthritis. Other rheumatic manifestations include acute pseudogout (pyrophosphate arthropathy) which presents as an acute monoarthritis, asymptomatic chondrocalcinosis and osteoporosis.

49- A 68-year-old woman complained of pain at the base of her right thumb. There was tenderness and swelling of the right first carpo-metacarpal joint.

What is the most likely diagnosis?

- 1) avascular necrosis of the scaphoid [0]
- 2) de Quervain's tenosynovitis [0]
- 3) osteoarthritis [100]
- 4) psoriatic arthritis [0]
- 5) rheumatoid arthritis [0]

Osteoarthritis of the 1st carpometacarpal joint is extremely common and in a 68-year-old lady is the most likely diagnosis. Swelling is usually bony hard and due to osteophyte formation which can lead to the appearance of squaring of the hand. De Quervain's tenosynovitis is a common overuse condition which presents with pain at the base of the thumb but is not associated with joint swelling. This joint can be affected in RA and psoriatic arthritis but rarely on its own.

Sciences (clinical)

1- Which of the following anatomical considerations is correct:

- 1) optic chiasm lesions characteristically produce a bitemporal hemianopia [100]
- 2) central scotoma occurs early in papilloedema [0]
- 3) in cortical blindness pupillary reactions are abnormal [0]
- 4) optic tract lesions produce an ipsilateral homonymous hemianopia [0]
- 5) optokinetic nystagmus is found with bilateral infarction of the parieto-occipital lobes [0]

b-Enlarged blind spot, d-contralateral, e-cerebellar lesions.

2- Which of the following is true regarding chromosomes?

- 1) Down's syndrome is most commonly due to an extra copy of chromosome 21 inherited from the father. [0]
- 2) A Fetus with triploidy will have 47 chromosomes [0]
- 3) Heterochromatin is mostly composed of active genes [0]
- 4) The normal human karyotype consists of 22 pairs of autosomes [100]
- 5) Telomeres provide the point of attachment to the mitotic spindle [0]

The human karyotype consists of 22 pairs of autosomes and 1 pair of sex chromosomes. Down's syndrome is most commonly due to trisomy of C21 with the majority a consequence of non-dysjunction within the ovum. Trisomy results in 47 chromosomes whereas Triploidy is the presence of 3 complete sets of chromosomes instead of two in all cells. Heterochromatin is of little genetic significance containing mostly inactivated genes. Telomeres are the distal extremities of the chromosomal arms but the centromeres provide the point of attachment to the mitotic spindle.

- 3- The action of noradrenaline released at sympathetic nerve endings is terminated by
 - 1) enzymatic decarboxylation [0]
 - 2) enzymatic inactivation by catechol-O-methyl transferase [0]
 - 3) re-uptake of noradrenaline by the axonal terminals [100]
 - 4) oxidative deamination by monoamine oxidase [0]
 - 5) Removal by the circulating blood [0]

A popular question for the exam but simple physiology gets the right answer here. The effects of neurotransmitter release are principally terminated by neuronal uptake. Intraneuronal NA is usually taken back up into the neurosecretory granules and a small amount is metabolised by MAO. Even smaller quantities that escape into the circulation are metabolised by COMT.

Anatomy

- 1- Which of the following statements are true of coronary artery anatomy?
 - 1) Right bundle branch block in acute anterior myocardial infarction suggests obstruction prior to the first septal branch of the left anterior descending coronary artery [100]
 - 2) the posterior descending artery is usually a branch of the circumflex artery [0]
 - 3) The sinus node is supplied by a branch of the right coronary in over 90% of subjects. [0]
 - 4) The AV node is supplied by the left anterior descending coronary artery. [0]
 - 5) The left main stem is about 4 cm long [0]

It is sometimes said that questions longer than 2 lines are usually false ... but not in this case.

The posterior descending artery is most often (85%) a branch of the right coronary artery. The sinus node artery is a branch of the right coronary artery in 60% of cases. The AV node is supplied from the posterior descending coronary artery. The left main stem is much shorter than 4 cm!

Read more on Coronary Artery Anatomy. <http://www.tmc.edu/thi/coroonat.html>

2- Which of the following would be the result of a spinal lesion at the level of C8?

- 1) a reduced brachioradialis reflex [0]
- 2) inability to abduct the shoulder [0]
- 3) loss of sensation over the lateral aspect of the arm [0]
- 4) winging of the scapula [0]
- 5) weakness of finger flexion [100]

a - brachioradialis is the "supinator" reflex and it is mediated by C5/6 b - deltoid is supplied by C5/6 c - medial forearm and hand is affected. Lateral aspect of arm is C5 d - this is caused by paralysis of the long thoracic nerve to serratus anterior (C5,6,7)

3- A 73-year-old man presents with an abrupt onset of double vision and left leg weakness. Examination shows weakness of abduction of the right eye, right-sided facial weakness affecting upper and lower parts of the face. He also has a left hemiparesis. Where is the lesion?

- 1) left frontal lobe [0]
- 2) left lateral medulla [0]
- 3) right corpus striatum [0]
- 4) right midbrain [0]
- 5) right pons [100]

The abducens nucleus is next to the facial nucleus in pons. they commonly coexist in a pontine CVA. Hemiparesis is also a common feature of pontine lesion.

4- Which of the following regarding the anatomy of the heart is true?

- 1) The aortic valve is tricuspid. [100]
- 2) The ascending aorta is entirely outside the pericardial sac. [0]
- 3) The left atrial appendage is identified readily by transthoracic echocardiography. [0]
- 4) The pulmonary trunk lies anterior to the ascending aorta. [0]
- 5) The right atrium is posterior to the left atrium. [0]

The pulmonary trunk lies posterior to the aorta. The ascending aorta lies completely within the pericardium as does the pulmonary trunk. The left atrium is the most posterior chamber of the heart, the right atrium is just anterior and to the right of the left atrium. The left atrial appendage is not readily seen on transthoracic echocardiography and requires transoesophageal echocardiography.

5- Which ONE of the following would be expected in a third nerve palsy?

- 1) Enophthalmos [0]
- 2) Constricted pupil [0]
- 3) Convergent strabismus [0]
- 4) Increased lacrimation [0]
- 5) Unreactive pupil to light [100]

There is typically ptosis with a dilated unreactive pupil. Enophthalmos is seen in Horner's syndrome. There would be a dilated not constricted pupil and a divergent

squint - affected eye deviated 'down and out'. Increased lacrimation may be seen in VIIth palsy.

6- An 80-year-old woman has a three month history of progressive numbness and unsteadiness of her gait. On examination, there is a mild spastic paraparesis, with brisk knee reflexes, ankle reflexes are present with reinforcement, extensor plantars, sensory loss in the legs with a sensory level at T10, impaired joint position sense in the toes, and loss of vibration sense below the iliac crests.

Investigations were as follows:-

haemoglobin 12.0 g/dl
MCV 99 fl

What is the most likely diagnosis?

- 1) anterior spinal artery occlusion [0]
- 2) dorsal meningioma [100]
- 3) multiple sclerosis [0]
- 4) subacute combined degeneration of the cord [0]
- 5) tabes dorsalis [0]

The presence of a sensory loss at T10 indicates a thoracic myelopathy. Subacute combined degeneration of the cord is unlikely as Hb and MCV are normal. Anterior spinal artery occlusion is unlikely as the history is progressive.

7- Which of the following anatomical considerations is correct:

- 1) optic chiasm lesions characteristically produce a bitemporal hemianopia [100]
- 2) central scotoma occurs early in papilloedema [0]
- 3) in cortical blindness pupillary reactions are abnormal [0]
- 4) optic tract lesions produce an ipsilateral homonymous hemianopia [0]
- 5) optokinetic nystagmus is found with bilateral infarction of the parieto-occipital lobes [0]

b-Enlarged blind spot, d-contralateral, e-cerebellar lesions.

8- Which of the following would be expected following distal occlusion of the posterior cerebral artery?

- 1) cerebellar ataxia [0]
- 2) contralateral hemiplegia [0]
- 3) dysarthria [0]
- 4) homonymous hemianopia [100]
- 5) palatal palsy [0]

Distal (peripheral territory) posterior cerebral artery stroke, homonymous hemianopia (often upper quadrantic), cortical blindness, verbal dyslexia without agraphia, hemivisual neglect, visual hallucinations(Harrisons).

9- A 48-year-old female patient develops an acute, severe and isolated right C6 radiculopathy affecting both the motor and sensory roots. She is examined in an EMG clinic 3 weeks after the onset of symptoms. Which of the following statements is true?

- 1) Absent sensory nerve potentials would be expected on examination of the thumb and index finger on the right. [100]
- 2) A repeat examination 12 months later is likely to reveal rapidly recruited low amplitude short duration motor units in the clinically involved muscle on EMG. [0]
- 3) Fibrillation potentials would be expected in the right brachioradialis and abductor pollicis brevis. [0]
- 4) Triceps tendon jerk is likely to be depressed or absent. [0]
- 5) Voluntary motor unit activity may be absent in the right biceps. [0]

A difficult question. Thumb and index finger are within the C6 dermatome. Abductor Pollicis Brevis and brachioradialis are supplied by C8/T1. Fibres from C7/8 are responsible for the triceps reflex. A pattern of rapidly recruited low amplitude short duration motor units on the EMG would be considered to represent myopathic changes rather than de-innervation.

Biochemistry

1- Which of the following is true concerning a 68 year old male with type 2 diabetes diagnosed with type IV renal tubal acidosis?

- 1) Aminoaciduria would be expected. [0]
- 2) Fludrocortisone treatment is effective [100]
- 3) Increased Glomerular filtration rate is expected. [0]
- 4) Increased urinary bicarbonate would be expected. [0]
- 5) Normal renal handling of K⁺ and H⁺ [0]

H⁺ secretion, sodium reabsorption and ammonia production diminishes. RTA 4 is in effect hyporeninaemic hypoaldosteronism or failure of aldosterone action and thus helped treated with mineralocorticoids. It is usually seen in chronic renal disease and hence low GFR and particularly. Aminoaciduria and increased urine bicarbonate are features of RTA types 1 and 2.

2- A 16 year old male with a day history of malaise, weakness and vomiting. He was diagnosed with Insulin dependent diabetes mellitus 3 years previously. Which ONE of the following supports a diagnosis of diabetic ketoacidosis:

- 1) Abdominal pain at onset [0]
- 2) A serum bicarbonate of 10 mmol/l [100]
- 3) A serum glucose 14 mmol/l [0]
- 4) Decreased appetite in the past few days [0]
- 5) Shallow respirations [0]

a-An unusual but recognised feature particularly in children. However does not support a diagnosis of DKA. b-Suggests metabolic acidosis. c-'Normoglycaemic DKA' can occur and a glucose of 14 doesn't rule out the diagnosis but it does not support the diagnosis. d-Usually patients are unwell with infections and anorexia. e-

Respiratory compensation leads to rapid deep (Kussmaul's) breathing. (Dr Mike Mulcahy)

3- Which of the following statements concerning abnormalities of the haemoglobin molecule is true?

- 1) Alpha thalassaemia is due to a deficiency of beta-chain production [0]
- 2) HbS is caused by a single base mutation on the beta-chain [100]
- 3) genes for the alpha and beta chains are located on the same chromosome [0]
- 4) in thalassaemia persistence of HbF is an adverse prognostic sign [0]
- 5) oligoneoclitide probes may assist in the diagnosis of haemoglobinopathies [0]

Alpha Thalassaemia is due to abnormalities of the alpha chain. Persistence of HbF has survival advantages in severely affected subjects. C-alpha 16, beta 11. e-Hb electrophoresis (Dr Shu Ho)

4- Which of the following is a characteristic feature of familial hypercholesterolaemia?

- 1) Autosomal dominant inheritance [100]
- 2) elevated chylomicrons [0]
- 3) hypertriglyceridaemia [0]
- 4) increased expression of LDL receptors [0]
- 5) Palmar xanthomas [0]

Familial hypercholesterolaemia is an autosomal dominant condition manifest by increased LDL concentrations (not chylomicrons) due to constitutional abnormalities and reduced numbers of the LDL receptor. Hypertriglyceridaemia is not characteristic and HDL concentrations are usually decreased. Tendon xanthomata are characteristic and the condition is associated with a premature cardiovascular mortality.

5- Which one of the following is a feature of the VIPoma syndrome?

- 1) Alkalosis [0]
- 2) Hypoglycaemia [0]
- 3) Hypokalaemia [100]
- 4) Increased gastric acid secretion [0]
- 5) Provocation of VIP release by somatostatin [0]

a, b, d, e: All opposite to what is expected. VIPOMA -Features vasoactive intestinal polypeptide secreting tumour, mainly pancreas rarely ganglioneuroblastoma (sympathetic chain or adrenal cortex), secretory diarrhoea ('pancreatic cholera'), weight loss, dehydration, abdominal colic, cutaneous flushing, raised plasma VIP, urea+Calcium, raised plasma pancreatic polypeptide, hypokalaemic acidosis (loss of alkaline secretions), achlorhydria, mildly raised glucose, normal functions of VIP. - increased intestinal secretion water and electrolytes -peripheral vasodilation -inhibits gastric acid secretion -potentiates acetylcholine action on salivary glands

6- In which of the following is mental retardation an expected finding?

- 1) Alkaptonuria [0]

- 2) Cystinuria [0]
- 3) Glycogen storage disease [0]
- 4) Lactose intolerance [0]
- 5) Maple syrup urine disease [100]

MENTAL RETARDATION. Fragile X syndrome-commonest male cause. Hypoxia at birth, intraventricular haemorrhage, rhesus disease, Congenital infections - toxoplasmosis, CMV, rubella, herpes), hypoglycaemia, meningitis, hypothyroidism (cretinism, tuberous sclerosis, Down's, Tay-Sach's, Cornelia De Lange, Hartnup - biochemical, treatable with diet. -homocystinuria, phenylketonuria -maple syrup urine disease, tryptophanuria -galactosaemia

7- Leukotrienes:

- 1) Are formed from the cyclooxygenase pathway [0]
- 2) Are synthesized by fibroblasts [0]
- 3) Decrease vascular permeability [0]
- 4) Leukotriene D4 has been identified as SRS-A which causes bronchial wall smooth muscle relaxation [0]
- 5) Stimulate mucus secretion [100]

Leukotrienes are synthesized by leucocytes. They are mediators of allergic reaction. They increase vascular permeability and attract neutrophils and eosinophils to inflammatory sites. Leukotrienes are synthesised via the lipoxygenase pathway. Leukotriene D4 has been identified as SRS-A which causes bronchial wall and intestinal smooth muscle contraction (not dilatation). Leukotrienes also stimulate mucus production, an important consideration in the pathophysiology of bronchial asthma.

8- Serum biochemistry of a 60 year old man revealed calcium of 1.98 mmol/l and phosphate of 0.55 mmol/l with an alkaline phosphatase of 450 IU/l. Which among the following most suits with the above serum biochemistry?

- 1) Osteoporosis [0]
- 2) Osteomalacia [100]
- 3) Paget's Disease [0]
- 4) Secondary Hyperparathyroidism [0]
- 5) Renal failure [0]

Osteomalacia is associated with low calcium and phosphate with raised alkaline phosphatase. Serum biochemistry is normal in osteoporosis. Paget's disease is associated with normal calcium and phosphate with raised alkaline phosphatase. In renal failure when tertiary hyperparathyroidism sets in there is low calcium with raised phosphate.

9- Low uptake of ^{123}I on the thyroid uptake scan would be an expected finding in:

- 1) A solitary toxic nodule [0]
- 2) A multi-nodular toxic goitre [0]
- 3) Amiodarone induced thyrotoxicosis type 1 [0]
- 4) DeQuervain's thyroiditis [100]

5) Graves' thyrotoxicosis [0]

DeQuervain's thyroiditis is classically associated with low or absent ¹²³I (the ¹³¹I radioactive isotope of iodine) uptake. The others will have high or normal uptake. In particular type 1 amiodarone induced thyrotoxicosis may be distinguished from the thyroiditis of type 2 by the normal or high uptake scan.

10- A 55 year-old female complaining of vague tiredness is found to have a serum corrected calcium concentration of 2.9 mmol/l. Examination was unremarkable. Which of the following results confirms the suspected diagnosis of primary hyperparathyroidism?

- 1) High normal 1,25-dihydroxyvitamin D concentration [0]
- 2) High normal 24 hour urinary calcium concentration [0]
- 3) High normal plasma parathyroid hormone concentration [100]
- 4) Low normal plasma phosphate concentration [0]
- 5) Low normal serum 25-hydroxyvitamin D concentration [0]

Bit too easy really. A high or even normal PTH concentration in the presence of hypercalcaemia would support the diagnosis of hyperparathyroidism. A high urinary Calcium concentration may be expected as would a low plasma phosphate but neither confirm the diagnosis. Elevated 1,25 VitD suggests a diagnosis of hypervitaminosis D.

11- Gaucher's Disease is associated with the deficiency of :

- 1) Hexosaminidase A [0]
- 2) Sphingomyelinase [0]
- 3) Arylsulphatase-A [0]
- 4) B- Glucosidase [100]
- 5) Iduronidase [0]

Hexosaminidase A deficiency is associated Tay-Sachs disease. Sphingomyelinase deficiency is associated with Niemann-Pick disease. Arylsulphatase-A deficiency is associated with metachromic leucodystrophy. Iduronidase deficiency is associated with Hurlers syndrome.

12- Which of the following is activated by Cholera toxin?

- 1) Adenylate cyclase [100]
- 2) Guanlyate cyclase [0]
- 3) Peroxisome proliferator receptor (PPAR) gamma [0]
- 4) Sodium/potassium ATPase [0]
- 5) The glucose-sodium transporter [0]

Cholera toxin activates adenylate cyclase with generation of cAMP.

13- Which of the following is true of Gilbert's syndrome?

- 1) inheritance is autosomal recessive [0]

- 2) serum conjugated bilirubin levels are elevated [0]
- 3) serum bilirubin levels are decreased by fasting [0]
- 4) serum bilirubin levels are decreased by liver enzyme inducers [100]
- 5) there is bilirubinuria [0]

Gilbert's syndrome is inherited in autosomal dominant fashion and affects 2-5% of the population. UDP glucuronyl transferase levels are reduced leading to an unconjugated hyperbilirubinaemia. Whilst serum bilirubin levels are elevated the other LFTs are normal. Jaundice deepens after a period of fasting or intercurrent illness but bilirubin levels are reduced by enzyme inducers such as phenobarbitone. As unconjugated bilirubin is tightly bound to albumin it cannot cross the glomerulus and so is not found in the urine. This contrasts with the bilirubin-glucuronide-albumin complex formed in patients with cholestatic jaundice (and raised conjugated bilirubin levels) where 1% of the complex is dialysable and although most of the bilirubin is reabsorbed in the proximal tubule some bilirubin is detectable in the urine.

14- With respect to lipoprotein transport and metabolism in the body, the following statements are correct EXCEPT:

- 1) Arterial walls contain cells with LDL receptors. [0]
- 2) Cholesterol is required for the formation of red blood cell membranes. [0]
- 3) Chylomicrons are synthesized in the liver. [100]
- 4) HDL is assembled in the extracellular space. [0]
- 5) VLDL transformation to LDL occurs in adipose tissue. [0]

Chylomicrons are formed in the gut from exogenous triacylglycerols and cholesterol. They are released into the lymph and thereby enter the blood. They are not formed in the liver.

15- Which ONE of the following is true concerning Antidiuretic hormone (ADH)?

- 1) Carbamazepine potentiates its release [100]
- 2) Ethanol potentiates its release [0]
- 3) It circulates in the blood bound to neurohypophysin [0]
- 4) It is a cyclic octapeptide [0]
- 5) It is synthesised in the posterior pituitary [0]

ADH is a nonapeptide manufactured in the paraventricular and supra-optic nuclei of the hypothalamus and released from the posterior pituitary. It acts on the collecting ducts improving water permeability and hence water retention. Carbamazepine as well as other agents such as thiazides and SSRIs may potentiate its release. Ethanol usually inhibits release.

16- A 75 year old man presents with a long history of shortness of breath and ankle oedema. His serum biochemistry shows sodium 122 mmols/l and potassium of 2.9 mmols/l. He now complains of weakness. Which of the following is likely to explain the above biochemical picture?

- 1) Addison's Disease [0]
- 2) Nephrotic syndrome [0]
- 3) Primary hyperaldosteronism [0]

- 4) SIADH [0]
- 5) Diuretic therapy [100]

The long history of his symptoms and serum biochemistry suggests that his condition is due to treatment with frusemide for CCF.

17- A 15-year-old girl was seen by her family physician because of increasing lethargy. She had a recent history of the "flu". Biochemistry tests show that she has renal impairment.

serum sodium 140 mmol/L (137 - 144)
serum potassium 4.2 mmol/L (3.5 - 4.9)
serum urea 28 mmol/L (2.5 - 7.5)
serum creatinine 280 μ mol/L (60 - 110)

Her condition does not improve after several weeks on corticosteroid therapy, so a renal biopsy is performed. The biopsy demonstrates the presence of segmental sclerosis of 3 of 10 glomeruli identified in the biopsy specimen. Immunofluorescence studies and electron microscopy do not reveal evidence for immune deposits. What is the most appropriate advice to give regarding her condition?

- 1) She has an underlying malignancy [0]
- 2) She may require a renal transplant in 10 years [100]
- 3) She will improve if she loses weight [0]
- 4) She will likely develop a restrictive lung disease [0]
- 5) She will probably improve with additional corticosteroid therapy [0]

The findings point to focal segmental glomerulosclerosis (FSGS), which leads to chronic renal failure in half of cases. The lack of resolution with corticosteroid therapy and the progression to chronic renal failure is what sets FSGS apart from minimal change disease.

18- Which of the following concerning the pH of urine is correct?

- 1) is a useful indicator of the acid/base balance of the blood [0]
- 2) rises on a vegetarian diet [100]
- 3) is determined by the concentration of ammonium [0]
- 4) is lower than 5.5 in renal tubular acidosis [0]
- 5) would be above 7.0 after prolonged and severe vomiting [0]

c - excretion of ammonium occurs when an acid urine is produced but the pH of urine is of course determined by the concentration of H⁺ ions d-unable to lower the pH to less than 5.5 in RTA e- This would be expected in an attempt to compensate for the loss of acid however when there is extracellular fluid depletion the retention of sodium takes priority. Instead of bicarbonate being excreted it is reabsorbed in the proximal and distal nephron and this perpetuates the metabolic alkalosis until the fluid balance is restored with IV fluids.

19- A young child presents with respiratory distress, worsening over 2 days. Blood gases show a pH of 7.25, a PCO₂ of 7.5kPa, a PO₂ of 8.5kPa, and a base excess of -4. Which of the following interpretations is correct?

- 1) Results are consistent with bronchopulmonary dysplasia. [0]
- 2) Blood gases suggest type 1 respiratory failure. [0]
- 3) Immediate intubation is required. [0]
- 4) Results are consistent with late severe asthma. [100]
- 5) Bicarbonate may be necessary to correct the acidosis. [0]

In interpreting blood gas results, the following sequence may be useful:

Inspect the pH: Is it low, normal or high?

Inspect the CO₂: Is it low, normal or high?

Inspect the PO₂: Is it low, normal or high?

If the pH is low then an acidosis is present, and inspecting the CO₂ will enable you to determine whether this is due to respiratory or metabolic causes. Inspecting the PO₂ will tell you whether the child is hypoxic or not. In this case, the pH is reduced, and the CO₂ is high, with a base deficit of only -4, insufficient to explain the acidosis from metabolic causes. This is, therefore, a respiratory acidosis, and the PO₂ is also a little low suggesting type 2 respiratory failure. Possible causes would include pneumonia, early hyaline membrane disease, ARDS. In asthma, the initial stages show a low CO₂, with this climbing only as a pre-terminal event. The results would therefore be consistent with late severe asthma. In bronchopulmonary dysplasia, there is usually long-term CO₂ retention with compensatory increase in bicarbonate leading to a positive base excess and normal pH. Bicarbonate is usually only considered if the base deficit exceeds about -8 or 00.

20 -A 45-year-old solicitor had an onset of severe, crushing, substernal chest pain while attending a football match. He collapsed on his way to the car. Bystander Cardiorespiratory Resuscitation was begun immediately and continued until arrival in Casualty where an endotracheal tube was inserted and ventilation was maintained on 100% oxygen.

Investigations revealed:

pH 7.13

PaO₂ 560 mmHg

PaCO₂ 18 mmHg

Bicarbonate 5.8

SaO₂ 98%

Based on these laboratory values, which of the following statements best describes his current pathophysiology?

- 1) He is demonstrating a primary respiratory alkalosis [0]
- 2) He probably developed a large right to left intracardiac shunt [0]
- 3) His anion gap is probably normal [0]
- 4) His oxyhemoglobin curve is shifted to the left [0]
- 5) His pulmonary artery pressure is probably elevated [100]

This young patient with severe central chest pain has probably arrested due to myocardial infarction and arrhythmia. His gases reveal high PO₂ following 100% O₂ but severe acidosis due to the arrest and lactic acidosis thus anion gap would be high. He does not have a primary ventilatory failure as his PO₂ is high. There is no left to right shunting and high pulmonary pressures would be expected after this arrest scenario.

21- A 19 year-old female is referred following a visit to the dentist where marked erosion of her teeth was noted. She was entirely asymptomatic and her only medication was the oral contraceptive pill. On examination her blood pressure was 110/70 mmHg and her body mass index was 21.5 kg/m² (18 - 25).

Investigations

sodium 135 mmol/l
potassium 2.1 mmol/l
bicarbonate 42 mmol/l
urea 2.6 mmol/L
corrected calcium 2.08 mmol/
alkaline phosphatase 201 iu/l (50-110)

What is the most likely diagnosis?

- 1) Bulimia nervosa [0]
- 2) Conn's syndrome [0]
- 3) Laxative abuse [0]
- 4) Pregnancy [0]
- 5) Primary hypoparathyroidism [100]

This patient has tooth erosion associated with hypokalaemic metabolic alkalosis and hypocalcaemia. This suggests a diagnosis of hypoparathyroidism. Conn's is unlikely in this age group, is not associated with tooth erosion and hypertension would be expected. Bulimia like laxative abuse would be associated with hypokalaemia but the hypocalcaemia with raised alkaline phosphatase would not be expected. Early pregnancy would not fit this picture.

22- Which of the following may be responsible for a hypokalaemic hypertension

- 1) Non-classical congenital adrenal hyperplasia [0]
- 2) Barter's syndrome [0]
- 3) Diabetic nephropathy [0]
- 4) Liddle's syndrome [100]
- 5) Type IV renal tubular acidosis [0]

Liddle's syndrome is typically associated with hypokalaemic hypertension and low renin and aldosterone concentrations - the so called pseudo-hyperaldosteronism. Barter's syndrome is associated with hypokalaemia though hypertension is not a feature. In type IV RTA, there is a hyporeninaemic hypoaldosteronism, which may also be produced with diabetic nephropathy. Hence hyperkalaemia is more typical.

23- A 35 year old male presents with weakness and tiredness. He is noted to be hypertensive. Electrolytes show a hypokalaemia and a hypomagnesaemia. What investigation would you select for this patient?

- 1) Colonoscopy [0]
- 2) Plasma renin to aldosterone ratio [100]
- 3) Serum amylase [0]
- 4) Serum calcium [0]
- 5) Oral glucose tolerance test [0]

The hypokalaemic hypertension with hypomagnesaemia suggests primary hyperaldosteronism. The most reliable assessment for this would be renin to aldosterone ratio.

24- A 60-year-old man was diagnosed last year with adenocarcinoma of the lung, and a 4 cm mass lesion was treated with a right lower lobectomy. He now has an abdominal CT scan that reveals scattered hepatic mass lesions and hilar lymphadenopathy. For several weeks, he has had increasing malaise. A urinalysis reveals marked proteinuria, and a 24 hour urine protein collection is 2.7 g/24hr. His serum urea is 30 mmol/L (2.5 - 7.5) with creatinine of 450 µmol/L (60 - 110). A renal biopsy is performed, and there is focal deposition of IgG and C3 with a granular pattern. He is most likely to have which of the following conditions?

- 1) Goodpasture's syndrome [0]
- 2) Membranous glomerulonephritis [100]
- 3) Minimal change glomerulonephritis [0]
- 4) Nodular glomerulosclerosis [0]
- 5) Rapidly progressive glomerulonephritis [0]

Most cases of membranous GN are idiopathic, but in some patients there is a history of an infection or a malignancy (usually lung) with antigenemia.

25- Which one of the following is true of IgE?

- 1) Is present in plasma in the same concentration as IgG [0]
- 2) Is increased acutely in an asthmatic attack [0]
- 3) Crosses the normal placenta [0]
- 4) Is increased in the serum of atopic individuals [100]
- 5) Is involved in type 2 hypersensitivity [0]

IgG is the predominant form of immunoglobulin in plasma at a concentration around 10,000 times that of IgE. IgG crosses the placenta to confer immunity to the fetus but IgE does not. IgE is involved in arming mast cells and basophils. IgE causes mast cells to release vasoactive amines, such as histamine, producing an inflammatory response which can result in a type I hypersensitivity reaction. IgE is responsible for allergen-mediated diseases such as anaphylaxis, asthma and atopy. Total serum IgE is frequently increased in those with atopy but serum IgE does not rise acutely during an asthmatic attack.

26- Which of the following features would be expected on lipid analysis in a 57 year old female with two year history of primary biliary cirrhosis?

- 1) A lipaemic appearance of the serum would be expected. [0]
- 2) is treated with clofibrate therapy [0]
- 3) is characteristically associated with tendon xanthomas [0]
- 4) is characteristically associated with palmar xanthomas [100]
- 5) No evidence of a dyslipidaemia would be expected with this short a duration of disease [0]

In prolonged cholestasis features include: increased serum cholesterol, a moderate increase in triglyceride, the serum is not lipaemic, and reduced HDL levels. Clinical features include: palmar xanthomas; tuberous xanthomas (particularly on extensor surfaces); tendinous xanthomas are rare. Xanthomas usually only occur if cholestasis has persisted for more than 3 months sometimes fat deposits may involve bone and peripheral nerves.

27- Which of the following is associated with Hyperuricaemia?

- 1) is usually due to an excess purine consumption [0]
- 2) occurs in association with acute lymphoblastic leukaemia [100]
- 3) in primary gout is inherited in an autosomal dominant manner [0]
- 4) can be reduced with low dose aspirin therapy [0]
- 5) can be treated with uricosuric drugs even in renal failure [0]

Hyperuricaemia may be due to increased purine intake, urate production or reduced urate clearance, and is most commonly due to the latter. Therefore it can occur in association with enhanced cell destruction particularly leukaemias. Primary gout has no obvious mode of inheritance, but familial juvenile gouty nephropathy is an autosomal dominantly inherited disorder. Low dose aspirin may exacerbate gout but high dose aspirin is uricosuric. Many of the uricosuric drugs may be detrimental in renal failure and may not be effective.

28- A 53-year-old man presented with hypertension of 150/110 mmHg. He is generally asymptomatic and has no previous medical history of note. He is a smoker of 5 cigarettes daily and drinks modest quantities of alcohol. He takes no prescribed medications. Examination reveals a BMI of 33.5 kg/m² but nil else. The following detail his investigations:

Serum sodium 146 mmol/l (NR 133-145)

Serum potassium 3.2 mmol/l (NR 3.5 - 5)

Urinary potassium excretion 42 mmol/l (NR less than 30)

What is the likely diagnosis?

- 1) Adrenocortical adenoma [100]
- 2) Bartter's syndrome [0]
- 3) Liddle's syndrome [0]
- 4) Liquorice ingestion [0]
- 5) Pheochromocytoma [0]

This patient is most likely to have Conn's syndrome as reflected by the hypokalaemic hypertension. Liquorice ingestion or Liddle's syndrome are again possible causes of hypokalaemic hypertension but the question asks for the most likely cause. This is Conn's and is most often caused by an adrenocortical adenoma. Aldosterone promotes active sodium transport and excretion of potassium in the renal tubules (and also sweat glands, salivary glands and colon). "Clinically, [Primary hyperaldosteronism] Conn's syndrome is characterized by hypertension (often diastolic hypertension), muscular weakness, paresthesias, headache, polyuria, and polydipsia." Read more ... <http://www.amershamhealth.com/medcyclopaedia/Volume%20IV%202/ALDOSTERONOMA.asp>

29- Phenytoin:

- 1) is a benzalkonium Derivative [0]
- 2) is clinically effective serum level is in the range on 2-10 micrograms/ml. [0]
- 3) A steady state blood level is achieved by 2-5 days [0]
- 4) Can be used in management of alcohol withdrawal syndrome [100]
- 5) Is the drug of choice in absence seizures. [0]

Phenytoin is an imidazolidine derivative. It relates to barbiturates in chemical structure. Clinically effective serum level is in the range on 10-20 micrograms/ml. A steady state blood level is achieved by 7-10 days.

30 -Which of the following techniques would be most useful in the differential diagnosis between ectopic Cushing's syndrome and pituitary dependent Cushing's disease.

- 1) Urine free cortisol [0]
- 2) High dose Dexamethasone suppression test [0]
- 3) ACTH concentrations [0]
- 4) Inferior petrosal sinus sampling [100]
- 5) CRF test [0]

Inferior petrosal sinus sampling with an elevated central ACTH concentration compared with the peripheral value is the most valuable test in the differential diagnosis of either Cushing's disease or ectopic Cushing's syndrome. The other tests are far less useful in comparison.

31- Hypomagnesaemia may be caused by which of the following drugs?

- 1) Aminophylline [0]
- 2) Cisplatin [100]
- 3) Co-trimoxazole [0]
- 4) Digoxin [0]
- 5) Amitriptyline [0]

Thiazide diuretics (not mentioned here) are a common cause of reduced serum magnesium. Cisplatin is a well recognised cause of hypomagnesaemia.

32- Which of the following concerning the conjugation of bilirubin is correct?

- 1) is catalysed by a glucuronyl transferase [100]
- 2) occurs in the Kupfer cells of the liver [0]
- 3) is increased by valproate [0]
- 4) is inhibited by rifampicin [0]
- 5) is impaired in Dubin-Johnson syndrome [0]

b - Hepatocytes. c - Enzyme inhibitor. d - Enzyme inducer. e - Conjugation is OK but excretion from the hepatocyte into the bile is impaired. (Gilbert's syndrome - bilirubin can't Go in to the hepatocyte - unconjugated bilirubinaemia. Crigler-Najjar syndrome - bilirubin can't Conjugate - unconjugated bilirubinaemia. Dubin-Johnson syndrome - bilirubin can't Depart from the hepatocyte - conjugated bilirubinaemia.)

33- Lipoprotein lipase deficiency is associated with:

- 1) Abetalipoproteinaemia [0]
- 2) Combined hyperlipidaemia [0]
- 3) Familial combined hyperlipidaemia [0]
- 4) Familial Hypercholesterolaemia [0]
- 5) Marked Hypertriglyceridaemia [100]

Lipoprotein lipase deficiency is autosomal recessive and associated with increased chylomicrons and marked hypertriglyceridaemia.

34- Metabolic alkalosis is characteristically found in which of the following?

- 1) An infusion of sodium chloride [0]
- 2) Ileostomy [0]
- 3) Mineralocorticoid deficiency [0]
- 4) Pyloric stenosis [100]
- 5) Salicylate poisoning [0]

Pyloric stenosis is associated with vomiting and the loss of stomach content – hence a metabolic alkalosis. Mineralocorticoid excess (Conn's syndrome) is associated with a metabolic alkalosis. Ileostomy may be associated with a loss of bicarbonate ions and hence acidosis. Salicylates are themselves acidic and produce a metabolic acidosis. A sodium chloride infusion is neutral and does not alter pH.

35- Which of the following is a recognised feature of abetalipoproteinaemia?

- 1) a high serum cholesterol [0]
- 2) palmar xanthomas [0]
- 3) advanced atherosclerotic vascular disease [0]
- 4) abnormal red blood cell morphology [100]
- 5) severe mental retardation [0]

Acanthocytes are seen in abetalipoproteinaemia.

Retinitis pigmentosa is seen in abetalipoproteinaemia. Mental retardation is not present but motor abnormalities and neurodegenerative are seen.

36- An Afro-Caribbean male aged 48 years presents with gradual onset of exertional dyspnoea, non productive cough, malaise, weight loss and polyarthralgia. Schirmers test indicates a dry eye. X-ray of the hand shows punched out osteopenic lesions. Which of the following investigation is unlikely to be helpful in establishing the diagnosis of this condition:

- 1) Serum calcium [0]
- 2) Serum phosphorus [0]
- 3) Urea and electrolytes [0]
- 4) Thallium Scan [100]
- 5) Quantitative Immunoglobulins. [0]

This condition is sarcoidosis. Serum calcium, Serum phosphorus, Chem7 and Chem 20 and Quantitative Immunoglobulins are all used in establishing the diagnosis. Gallium scan is helpful in sarcoidosis. (Radiology of extrathoracic sarcoid ...)

<http://www.meddean.luc.edu/lumen/MedEd/Radio/sarc/xtrthora.htm>

Gallium scan vs. Thallium scan.

Gallium scan (radioactive ^{67}Ga) is used to detect inflammation - such as in inflammatory disorders or malignancy.

Thallium (radioactive ^{201}Tl) is a potassium analogue and is used to demonstrate areas of poor perfusion. It is particularly used in cardiology to detect areas of ischaemia.

Genetics

1- A 35-year-old man presents with an inherited neurological disorder. His father developed the disease in his 60s and his daughter was born 2 years ago with a severe form of the condition. His mother, sister, wife and other child, a son, are unaffected. What is the mode of inheritance?

- 1) autosomal inheritance [0]
- 2) Mitochondrial inheritance [0]
- 3) Polygenic inheritance [0]
- 4) Trinucleotide repeat disease [100]
- 5) X-linked inheritance [0]

The inheritance from this man's father, to himself and then to his daughter shows increasing disease severity and earlier onset of disease in subsequent generations. This is genetic anticipation and is typical of trinucleotide repeat disease where there is expansion of the repetitive sequence of three nucleotides with each generation. Also the length of the expansion increases as cells divide through an individual's life. Trinucleotide repeat diseases include Huntington's disease, myotonic dystrophy, fragile X syndrome, and Friedreich's ataxia.

2- Which of the following conditions may be detectable by growth monitoring?

- 1) Hyperthyroidism [0]
- 2) Hypothyroidism [100]
- 3) Pseudohypoparathyroidism [0]
- 4) XYY Syndrome [0]
- 5) Insulin dependent diabetes mellitus [0]

Benefits of growth monitoring include:

Early detection of conditions such as:

hypothyroidism.

growth hormone insufficiency.

syndromes: Turners, Russell-Silver, Noonan's, skeletal dysplasias.

growth impairment e.g. coeliac disease, inflammatory bowel disease or chronic renal failure.

intracranial tumours.

short normal children.

children with short stature.

Health promotion: impaired growth may be associated with child abuse or neglect for example.

Focus of interest for parents.

Public health aspects:

secular trend of increasing growth.

linking growth patterns in fetal life and early infancy with adult patterns of disease.

link between height and social circumstances.

3- You are asked advice by a young professional couple, Mr and Mrs X. Mrs X is 9 weeks pregnant. Mr X's brother and his partner had a child with cystic fibrosis. As a result, Mr X was screened and found to carry the DF508 mutation for cystic fibrosis. Mrs X declines to be tested. What are the chances of Mr and Mrs X's child having cystic fibrosis, given that the gene frequency for this mutation in the general population is $1/20$.

- 1) $1/4$ [0]
- 2) $1/20$ [0]
- 3) $1/40$ [0]
- 4) $1/80$ [100]
- 5) $1/160$ [0]

The chance of Mrs X being a carrier of the gene is $1/20$. The chances of two carriers of a recessive gene having a child that is homozygous for that disease (i.e. both genes are transmitted to the child) is $1/4$. Therefore, the chances of this couple having a child with CF are $1/4 \times 1/20 = 1/80$.

4- In meiosis which of the following is true?

- 1) DNA replication occurs during meiosis 1. [0]
 - 2) At the beginning of meiosis 2, each cell contains 23 single chromosomes. [0]
 - 3) Anaphase lag results in one of the 2 daughter cells receiving an extra part of one chromosome. [0]
 - 4) Non-disjunction at mitosis (meiosis 2) results in mosaicism. [100]
 - 5) The incidence of Down's Syndrome due to translocation increases with increasing maternal age. [0]
-

Meiosis is the form of cell division that produces gametes. It is divided into 2 parts meiosis 1 and meiosis 2. DNA replication occurs before meiosis 1, and the cell begins division with twice the normal cellular amount of DNA.

In meiosis 1, each daughter cell gets one of the duplicated chromosomes of each pair. At the beginning of meiosis 2, each cell contains 23 chromosomes each with a duplicated pair of chromatids.

In meiosis 2, the duplicated pair separate and each daughter cell ends up with one of each of the 23 chromosomes (4 haploid daughter cells). Two common areas of cell division occurring during meiosis are non-disjunction (2 chromosomes fail to separate, so both copies of the chromosome go to one of the daughter cells); and anaphase lag in which a chromatid is lost because it fails to move quickly enough during anaphase to become incorporated into one of the new daughter cells.

In Down's Syndrome, non-disjunction accounts for 94% of cases. The incidence of this increases with increasing maternal age. 5% of cases are due to translocation, and 1% to mosaicism

5- Which ONE of the following have their own self replicating DNA?

- 1) Golgi body [0]
- 2) Lysosomes [0]
- 3) mitochondria [100]
- 4) Peroxisome [0]
- 5) Rough Endoplasmic Reticulum [0]

Abnormalities of Mitochondrial DNA are associated with inherited conditions such as Leber's OA, MELAS syndrome and DIDMOAD(Dr Vajira H. W. Dissanayake)

6- A 35 year old male presents with oral and genital mucocutaneous ulcerations associated with polyarthritis affecting the lower limbs. He is currently on warfarin for an recent episode of pulmonary embolism. Which of the genetic association is most commonly associated with his condition:

- 1) HLA A3 [0]
- 2) HLA B5 [100]
- 3) HLA B27 [0]
- 4) HLA DR3 [0]
- 5) HLA DR2 [0]

This is Behcet's disease.It is associated with increased risk of thrombosis. It is linked to HLA B5.

7- A 62 year old man has experienced substernal chest pain upon exertion with increasing frequency over the past 1 year. An electrocardiogram shows T wave inversion in the anterolateral leads at rest. He has a total serum cholesterol of 7.0 mmol/l. On angiography, he has an 85% narrowing of the left anterior descending artery.

Which of the following events is most likely to occur in this patient?

- 1) A systemic artery embolus from thrombosis in a peripheral vein. [0]
- 2) A systemic artery embolus from a left atrial mural thrombus. [0]
- 3) Pulmonary embolism from a left ventricular mural thrombus [0]
- 4) A systemic artery embolus from a left ventricular mural thrombus. [100]
- 5) Pulmonary embolism from thrombosis in a peripheral vein. [0]

The suggestion here is that this man has coronary artery disease with an impending myocardial infarction. Infarction of the LAD would cause necrosis of the left ventricle. Thrombus may form on an area of dyskinetic ventricle. Therefore he is most at risk of embolus of thrombus from the LV.

8- With respect to lipoprotein transport and metabolism in the body, the following statements are correct EXCEPT:

- 1) Chylomicrons are synthesized in the liver. [100]
- 2) HDL is assembled in the extracellular space. [0]
- 3) Arterial walls contain cells with LDL receptors. [0]
- 4) VLDL transformation to LDL occurs in adipose tissue. [0]
- 5) Cholesterol is required for the formation of red blood cell membranes. [0]

Chylomicrons are formed in the gut from exogenous triacylglycerols and cholesterol. They are released into the lymph and thereby enter the blood. They are not formed in the liver.

9- Which of the following is a feature of hereditary haemorrhagic telangiectasia?

- 1) a good response to oestrogen therapy [0]
- 2) cerebral arteriovenous malformations [100]
- 3) GI haemorrhage as the usual presenting feature [0]
- 4) telangiectasia of the mucous membranes, but not the skin [0]
- 5) tendency of lesions to become less obvious with age [0]

In hereditary haemorrhagic telangiectasia there may also be pulmonary AV malformations.

Epistaxis, not GI haemorrhage, is the usual presenting feature. Lesions become more obvious with age and affect mucous membranes as well as skin. Oestrogen therapy is sometimes advocated but the effect, if any, is small.

10- Genetic anticipation occurs characteristically in all the conditions except

- 1) myotonia dystrophica [0]
- 2) spinocerebellar ataxia type 1 [0]
- 3) Marfan's syndrome [100]
- 4) Huntingdon's disease [0]
- 5) Fragile X syndrome [0]

Anticipation means increased severity/earlier age of onset of disease with successive generations. Other conditions with anticipation include spinocerebellar ataxia type 1 and dentatorubral pallidoluysian atrophy.

11- Transcription RNA (tRNA) has three bases specific for a particular amino acid with which it binds to messenger RNA (mRNA). This specific area of tRNA is called the

- 1) anticodon [100]
- 2) codon [0]
- 3) exon [0]
- 4) intron [0]
- 5) transposon [0]

mRNA has codons which are bound by the anticodons on tRNA during translation of protein synthesis. Exons are non-coding sequences in the mRNA and introns are areas of unknown function. Transposons are genetic sequences that have been transposed from one part of DNA to another.

12- A 44-year-old man has had no major medical problems throughout his life, except for arthritis pain involving all extremities for the past couple of years. He has had worsening orthopnoea and ankle oedema in the past six months. He is afebrile. There is no chest pain. A chest X-ray shows cardiomegaly with both enlarged left and right heart borders, along with pulmonary oedema. Laboratory test findings include sodium 139 mmol/L, potassium 4.3 mmol/L, urea 7 mmol/L creatinine 95 µmol/L, and glucose 8.6 mmol/L. Which of the following additional laboratory test findings is he most likely to have?

- 1) Anti-centromere antibody titer of 1:320 [0]
- 2) Erythrocyte sedimentation rate of 79 mm/Hr [0]
- 3) Haemoglobin of 10.7 g/dL with MCV of 72 fL [0]
- 4) Serum ferritin of 3400 pmol/L [100]
- 5) Spherocytes in his peripheral blood smear [0]

He has findings of a cardiomyopathy with right and left heart failure. Hereditary haemochromatosis (HHC) is suspected with a serum ferritin > 1000 and confirmed by genetic testing. It is characterised by diabetes, CCF, pseudogout and slate-grey skin. "HHC is an autosomal recessive condition and in 90% of cases in the United Kingdom (UK) the condition is owing to homozygosity for the C282Y mutation in the HFE gene.² A second mutation in the HFE gene, H63D, can cause the disease when in the presence of a single C282Y mutation (the so-called 'compound heterozygote' state). These mutations are common in people of Northern European origin with a carrier frequency of the C282Y mutation of one in 10–17, in the UK, suggesting a prevalence of people homozygous for the C282Y mutation of between one in 100 and one in 280.³ If HHC becomes symptomatic by mid-life, a general practitioner (GP) with a list size of 2000 patients should have approximately four cases. In our experience most GPs claim to have never seen a case. Herein lies the conundrum: is HHC far more common than is currently recorded in clinical records and death registers because it is not being diagnosed, or does significant disease not develop in a large proportion of C282Y homozygotes and compound heterozygotes?" More ...

13- Which ONE of the following is associated with Marfan's syndrome?

- 1) Autosomal recessive inheritance [0]
- 2) increased upper : lower body ratio [0]
- 3) Mental retardation [0]
- 4) Pulmonary stenosis [0]
- 5) Retinal detachment [100]

Marfan's syndrome is an autosomal dominant condition associated with ocular abnormalities such as upwards lens dislocation and retinal detachment. Aortic regurgitation may be a finding and aneurysmal dilatation is a feature. Upper to lower body ratio (head to symphysis pubis : Symphysis pubis to toes) is decreased in Marfan Syndrome.

14- Autosomal recessive disorders include

- 1) Achondroplasia [0]
- 2) Congenital Adrenal Hyperplasia [100]
- 3) Familial hypercholesterolaemia [0]
- 4) Hereditary Haemorrhagic Telangiectasia [0]
- 5) Huntington's disease [0]

All the others are autosomal dominant of course.

15- In Down syndrome, which is the commonest congenital heart defect?

- 1) Atrial septal defect [0]
- 2) Atrioventricular septal defect [100]
- 3) Patent ductus arteriosus [0]
- 4) Tetralogy of Fallot [0]
- 5) Ventricular septal defect [0]

50% of Down syndrome births have congenital heart disease. Defects in order of decreasing frequency are: B, E, C, D and A.

16- Lipoprotein lipase deficiency is associated with:

- 1) Abetalipoproteinaemia [0]
- 2) Combined hyperlipidaemia [0]
- 3) Familial combined hyperlipidaemia [0]
- 4) Familial Hypercholesterolaemia [0]
- 5) Marked Hypertriglyceridaemia [100]

Lipoprotein lipase deficiency is autosomal recessive and associated with increased chylomicrons and marked hypertriglyceridaemia.

17- Concerning Neurofibromatosis Type 1 (NF1), which one of the following statements is true?

- 1) Bilateral acoustic neuromas are common [0]
- 2) Clinical severity in individuals is similar in a given family [0]
- 3) New mutations occur rarely [0]
- 4) Pigmented spots on the iris are a characteristic feature [100]
- 5) The diagnosis is likely if two café-au-lait patches are present [0]

Lisch nodules of the iris are present in more than 90% of patients.

Bilateral acoustic neuromas is a hallmark feature of neurofibromatosis type 2.

Expressivity of the gene is highly variable and members of the same family usually show wide differences in clinical symptoms.

NF1 is one of the most common autosomal dominant conditions. However almost half of all cases give no family history and are new mutations. The mutation rate is estimated to be 1:10,000 gametes.

The diagnosis is suggested by six or more café- au- lait macules (spots), each over 5 mm in diameter in prepubescent individuals and over 15 mm in postpubertal individuals.

18- The following are features of pseudohypoparathyroidism:

- 1) Increased urinary phosphate and cAMP with PTH infusion [0]
- 2) Low serum PTH [0]
- 3) Low serum calcium and low serum phosphate [0]
- 4) Low serum calcium and high serum phosphate [100]
- 5) Shortened 2nd and 3rd metacarpals [0]

The biochemistry shows a hypocalcaemia with hyperphosphataemia being usual but elevated PTH due to resistance to parathormone (PTH). This is due to mutation of the PTH receptor with abnormality of the G α subunit with reduced cAMP production following a PTH infusion. There are associated phenotypic signs including short stature, low IQ and shortened 4th and 5th metacarpals.

19- Reverse transcriptase-PCR is used to amplify:

- 1) Antibodies [0]
- 2) DNA [0]
- 3) RNA [100]
- 4) Protein [0]
- 5) Plasmids [0]

Reverse transcriptase PCR is a means of amplifying RNA. The RNA is transcribed into complimentary DNA (cDNA) using the enzyme reverse transcriptase, the cDNA is then amplified by conventional PCR.

20 -Which of the following is a characteristic feature of familial hypercholesterolaemia?

- 1) Autosomal dominant inheritance [100]
- 2) elevated chylomicrons [0]
- 3) hypertriglyceridaemia [0]
- 4) increased expression of LDL receptors [0]
- 5) Palmar xanthomas [0]

Familial hypercholesterolaemia is an autosomal dominant condition manifest by increased LDL concentrations (not chylomicrons) due to constitutional abnormalities and reduced numbers of the LDL receptor. Hypertriglyceridaemia is not characteristic and HDL concentrations are usually decreased. Tendon xanthomata are characteristic and the condition is associated with a premature cardiovascular mortality.

21- The parents of a child with cystic fibrosis consult you wishing to know what is the risk of their next child being a carrier of the condition. Which ONE of the following percentages is the correct risk?

- 1) 0% [0]
- 2) 25% [0]
- 3) 50% [100]
- 4) 75% [0]
- 5) 100% [0]

As both parents are carriers for the CF gene then the chances of another child being affected (homozygote) is 1 in 4 (25%). The chances of their child being free from the CF gene is also 1 in 4 (25%) and the chances of a child being a carrier (heterozygote) is 1 in 2 (50%).

22- Which of the following is NOT true regarding the polymerase chain reaction:

- 1) It is used to amplify DNA but not RNA [0]
- 2) The amount of DNA required makes it unsuitable for early prenatal diagnosis [100]
- 3) Synthetic short DNA primers which flank the sequence of interest are required to initiate the amplification [0]
- 4) It utilizes the thermostable properties of Taq DNA polymerase [0]
- 5) It can be used to detect the presence of viral DNA in human disease [0]

rt-PCR is used to amplify RNA rather than PCR specifically. Preimplantation diagnosis uses IVF and genetic analysis of 3 day old embryos, before selective transfer of unaffected embryos to uterus.

23- The Polymerase Chain Reaction (PCR) is used to amplify small amounts of DNA for further analysis. First the DNA double helix must be split into two strands. This is achieved by

- 1) alkali solution [0]
- 2) centrifugation [0]
- 3) DNA polymerase [0]
- 4) heating to nearly 100°C [100]
- 5) viral reverse transcriptase [0]

To the small sample of DNA are added two oligonucleotides with sequences that have affinity for both ends of the area of DNA that is being studied. A thermostable DNA polymerase is also added. At 94°C DNA literally melts into two single strands and with cooling the oligonucleotides bind to the areas surrounding the particular area of DNA that is being analysed. These act as primers for the DNA polymerase and a new double helix of DNA is formed. The cycle is repeated doubling the amount of DNA each time.

24- Protein synthesis occurs within cells. A particular molecule that is produced in the nucleus initiates protein synthesis. This molecule matures in the cytoplasm and binds to the ribosome. This molecule is

- 1) messenger RNA [100]
- 2) ribosomal RNA [0]
- 3) RNA nucleotide [0]
- 4) RNA polymerase [0]
- 5) transfer RNA [0]

Protein synthesis consists of two phases. Transcription is where one strand of the DNA double helix is used as a template by RNA polymerase to synthesize messenger RNA from RNA nucleotides. The mRNA then migrates into the cytoplasm maturing - for example by the splicing of non-coding sequences. Translation occurs when the ribosome binds to mRNA at the start codon and transfer RNA brings amino acids into position along the mRNA template. The ribosome moves from codon to codon along the mRNA producing a polypeptide sequence.

25- A 17-year-old girl is short in stature for her age. She has not shown any changes of puberty. She has a webbed neck. Her vital signs include Temperature 36.6°C Respiratory rate 18/min Pulse 75 bpm and BP 165/85 mmHg. On physical examination, she has a continuous murmur heard over both the front of the chest as well as her back. Her lower extremities are cool with poor capillary filling. A chest radiograph reveals a prominent left heart border, no oedema or effusions, and rib notching. Which of the following pathologic lesions best explains these findings?

- 1) Constriction of the aorta past the ductus arteriosus [100]
- 2) Lack of development of the spiral septum and partial absence of conus musculature [0]
- 3) Shortening and thickening of chordae tendineae of the mitral valve [0]
- 4) Single large atrioventricular valve [0]
- 5) Supravalvular narrowing in the aortic root [0]

She has coarctation of the aorta, and the constriction is postductal, allowing prolonged survival. Her physical characteristics also suggest Turner syndrome (monosomy X).

26- Autosomal dominant conditions include

- 1) Beta-thalassaemia [0]
- 2) Cystic fibrosis [0]
- 3) Marfan syndrome [100]

- 4) Wilson's disease [0]
- 5) Xeroderma Pigmentosa [0]

All the others are autosomal recessive of course.

27- A 19-year-old woman is found to have a cardiac murmur characterized by a mid-systolic click. An echocardiogram reveals mitral insufficiency with upward displacement of one leaflet. There is also aortic root dilation to 4 cm. She has a dislocated right ocular crystalline lens. She dies suddenly and unexpectedly. The medical examiner finds a prolapsed mitral valve with elongation, thinning, and rupture of chordae tendineae. A mutation involving which of the following genes is most likely have be present in this patient?

- 1) Beta-myosin [0]
- 2) CFTR [0]
- 3) FGFR [0]
- 4) Fibrillin [100]
- 5) Spectrin [0]

Marfan syndrome is a connective tissue disorder that is associated with floppy mitral valve and also with cystic medial necrosis that predisposes to aortic dissection. Abnormalities of the beta-myosin gene may be associated with some forms of dilated cardiomyopathy. The CFTR gene is associated with cystic fibrosis. The obstructive lung disease from widespread bronchiectasis that results from cystic fibrosis involving the lung can lead to pulmonary hypertension with cor pulmonale. The fibroblast growth factor receptor (FGFR) gene mutations can be associated with skeletal dysplasias. The spectrin gene mutation can be associated with red cell membrane abnormalities associated with hereditary spherocytosis. Anemias in adults with this condition are not typically severe, though anemias in general can increase cardiac stress.

28- A Plasmid is best described as

- 1) a recombinant section of DNA [0]
- 2) a small viral particle [0]
- 3) bacterial DNA separate from the chromosome [100]
- 4) consist of multiple copies of a single gene [0]
- 5) having multiple origins of replication [25]

Plasmids are circular molecules of bacterial DNA separate from the bacterial chromosome. They are usually small consisting of a few thousand base pairs, carry one or a few genes, and have a single origin of replication. Genes on plasmids with multiple copies are usually expressed at higher levels. In nature these genes often encode for proteins such as those needed for bacterial resistance. Plasmids can be used to clone genes by splicing a particular gene into a plasmid and then allowing the bacteria to multiply - this is then called recombinant plasmid DNA.

29- A 59 year old woman has had insulin dependent diabetes mellitus for over two decades. The degree of control of her disease is characterized by the laboratory

finding of a HbA1c of 10.1%. She complains of repeated episodes of abdominal pain following meals. These episodes have become more frequent and last for longer periods over the last couple of months. On physical examination, there are no abdominal masses and no organomegaly of the abdomen, and she has no tenderness to palpation. Which of the following findings is most likely to be present:

- 1) Ruptured aortic aneurysm [0]
- 2) Hepatic infarction [0]
- 3) Mesenteric artery occlusion [100]
- 4) Acute pancreatitis [0]
- 5) Chronic renal failure [0]

Diabetes- especially Type 2 diabetes- is associated with macrovascular disease. Smoking is a further risk factor for macrovascular atherosclerosis. After a meal splanchnic blood flow is increased. If the mesenteric artery is occluded the lack of blood flow to the bowel will produce ischaemic type pain. Chronic renal failure may be present but would not cause post prandial pain. Ruptured aortic aneurysm would normally present acutely with hypotension, cold lower limbs with reduced pulses and a pulsatile, tender abdominal mass. Pancreatitis is unlikely given the history and the lack of epigastric tenderness. Hepatic infarction should lead to right upper quadrant pain.

30- A 51-year-old healthy man is found to have bilateral breast enlargement. He says that this is normal for him and that he has not noted any change in years. Which of the following is most likely to be present?

- 1) 47, XXY karyotype [100]
- 2) History of antidepressant drug therapy [0]
- 3) Increased risk for breast carcinoma [0]
- 4) Increased testosterone levels [0]
- 5) Seminoma of the testis [0]

Gynaecomastia is common with Klinefelter's syndrome. Male breast cancer is rare and is more often associated with advanced age. There is an association between gynaecomastia and some functioning testicular tumors such as Leydig cell tumors (or rarely, Sertoli cell tumors). Gynaecomastia is related to conditions of high oestrogens, and one of the most common causes for this is cirrhosis of the liver in chronic alcoholics.

31- Two strains of *Escherichia coli* are isolated and both are resistant to ampicillin. Strain A retains its resistance to ampicillin when grown from multiple generations in the absence of ampicillin. However strain B loses its resistance when grown in the absence of ampicillin. Which of the following best explains the loss of antibiotic resistance in strain B?

- 1) Changes in the bacterial DNA gyrase [0]
- 2) Downregulation of the resistance gene [0]
- 3) Loss of a plasmid containing the resistance gene [100]
- 4) Mutations in the resistance gene [0]
- 5) Transposition of another sequence into the resistance gene [0]

Bacteria develop resistance to antibiotics by gaining genes that encode for particular proteins that offer protection to the organism. Sometimes this is by mutation and other times the gene may be acquired from another bacterial species. The genes are usually found in plasmids - circular segments of DNA separate from the bacterial chromosome. Plasmids can easily spread from one bacteria to another - a sort of resistance package that bacteria can share.

32- Which of the following is true regarding chromosomes?

- 1) Down's syndrome is most commonly due to an extra copy of chromosome 21 inherited from the father. [0]
- 2) A Fetus with triploidy will have 47 chromosomes [0]
- 3) Heterochromatin is mostly composed of active genes [0]
- 4) The normal human karyotype consists of 22 pairs of autosomes [100]
- 5) Telomeres provide the point of attachment to the mitotic spindle [0]

The human karyotype consists of 22 pairs of autosomes and 1 pair of sex chromosomes. Down's syndrome is most commonly due to trisomy of C21 with the majority a consequence of non-dysjunction within the ovum. Trisomy results in 47 chromosomes whereas Triploidy is the presence of 3 complete sets of chromosomes instead of two in all cells. Heterochromatin is of little genetic significance containing mostly inactivated genes. Telomeres are the distal extremities of the chromosomal arms but the centromeres provide the point of attachment to the mitotic spindle.

33- A 36-year-old man attends clinic with his wife after failing to conceive after 10 years of marriage. Examination reveals that he is tall, thin and has bilateral gynaecomastia. Investigations show high levels of urinary gonadotrophins.

What is the most likely diagnosis?

- 1) Andropause [0]
- 2) Gaucher's disease [0]
- 3) Klinefelter's syndrome [100]
- 4) Marfan syndrome [0]
- 5) Noonan's syndrome [0]

Gaucher's and Marfan syndrome do not present with infertility. Noonan's is associated with short stature. Klinefelter's is a sex chromosome disorder affecting 1:400 - 1:600 male births typically with 47 XXY, XXXYY or XXYY. Andropause is the term for the gradual decrease in serum testosterone concentration with age, but does not occur, usually, until after the age of 50.

34- Which one of the following statements is correct?

- 1) adult polycystic renal disease is inherited as an autosomal recessive trait [0]
- 2) reflux nephropathy is inherited as an autosomal recessive trait [0]
- 3) nephrogenic diabetes insipidus is inherited as an autosomal dominant trait [0]
- 4) Alport's syndrome affects females more severely than males [0]
- 5) medullary sponge kidney is typically not inherited but is a congenital condition. [100]

PKD is usually autosomal dominant although the infantile form is autosomal recessive. Nephrogenic DI is usually X-linked. Features of Alport syndrome (hereditary nephritis, haematuria, progressive renal failure and high-frequency nerve deafness) are usually more marked in males. Neither reflux nephropathy nor medullary sponge kidneys are hereditary conditions.

35- A 22-year-old lady is affected by an inherited disorder. She has two brothers who are unaffected. She has two sisters both are affected. Her father is affected but not her mother. What is the mode of inheritance?

- 1) Autosomal Dominant [50]
- 2) Autosomal Recessive [0]
- 3) Mitochondrial [0]
- 4) X-linked Dominant [100]
- 5) X-linked Recessive [0]

X-linked dominant disorders are rare (e.g. Vitamin D-resistant rickets). The affect both sexes but females more than males. All children of a homozygous mother are affected. Half the sons and half the daughters inherit the disorder from an affected mother with the trait. An affected father passes the disease to all his daughters but none of his sons - as in this example. Another explanation would be an autosomal dominant disorder inherited, by chance, only by the daughters. However, this is not the best answer.

36- A 60-year-old Chinese man has been started on quinine for leg cramps by his General Practitioner. He presents, a week later, with 5 days of darkened urine and 2 days of increasing breathlessness, back pain and fatigue. Investigations show a haemoglobin of 7.0 g/dl and raised reticulocyte count. Which of the following best explain this drug reaction?

- 1) autoimmune haemolytic anaemia [0]
- 2) glucose-6-phosphate dehydrogenase deficiency [100]
- 3) hereditary spherocytosis [0]
- 4) pyruvate kinase deficiency [0]
- 5) sickle cell disease [0]

G6PDH (X-linked recessive) is seen in African, Mediterranean, Iraqi Jew, South East Asian and Chinese people and predisposes to a haemolytic anaemia reaction with drugs or infection. Implicated drugs include - aspirin, sulphonamides, antimalarials, and quinidine. The haemolytic anaemia is non-immune (DAT -ve). Pyruvate Kinase Deficiency is autosomal recessive and presents as a chronic haemolytic anaemia exacerbated by viral infections. Hereditary spherocytosis is characterised by variable chronic non-immune haemolysis exacerbated by infections.

37- Benign Essential Tremor:

- 1) Is present characteristically at rest [0]
- 2) Occur with lesion in sub thalamus [0]
- 3) Occur in liver disease [0]
- 4) Alcohol improves the tremor [100]

5) Is autosomal recessive in inheritance [0]

There is no tremor at rest, but a rhythmic oscillation develops when the patient holds the arms outstretched. A positive family history is obtained in over half of such patients and the pattern of inheritance in such families indicates an autosomal dominant trait. Alcohol suppresses essential tremor, but the mechanism responsible is unknown

38- In which of the following is mental retardation an expected finding?

- 1) Alkaptonuria [0]
- 2) Cystinuria [0]
- 3) Glycogen storage disease [0]
- 4) Lactose intolerance [0]
- 5) Maple syrup urine disease [100]

MENTAL RETARDATION. Fragile X syndrome-commonest male cause. Hypoxia at birth, intraventricular haemorrhage, rhesus disease, Congenital infections - toxoplasmosis, CMV, rubella, herpes), hypoglycaemia, meningitis, hypothyroidism (cretinism, tuberous sclerosis, Down's, Tay-Sach's, Cornelia De Lange, Hartnup - biochemical, treatable with diet. -homocystinuria, phenylketonuria -maple syrup urine disease, tryptophanuria -galactosaemia

39- In X-linked recessive inheritance, which of the following is true?

- 1) The male to female ratio is 2:1. [0]
- 2) Each son of a female carrier has a 1:4 risk of being affected. [0]
- 3) Each daughter of a female carrier has a 1:4 risk of being a carrier. [0]
- 4) Daughters of affected males will all be carriers. [100]
- 5) The family history is often positive since new mutations are rare. [0]

Over 250 X-linked recessive disorders have been described. The commonest include red/green colour blindness, Duchenne and Becker muscular dystrophies, Fragile X Syndrome, G6PD deficiency, haemophilias A&B, and Hunter's Syndrome. The abnormal gene is carried on the X chromosome, and in the carrier female, the normal allele on her other X chromosome protects her from the disease. Since the male does not have this protection, he manifests the disease. In X-linked inheritance therefore:

Males are all affected.

Females only occasionally show mild sign of disease.

Each son of a female carrier has a 1:2 chance of being affected.

Each daughter of a female carrier has a 1:2 risk of being a carrier.

Daughters of affected males will all be carriers, but sons of affected males will not be affected since the Y chromosome is derived from father.

The family history may be negative, however, since new mutations are fairly common. Carrier females can be identified from time to time from mild clinical manifestations and from specific tests such as biochemical markers, e.g. CK in DMD.

40- The level of cellular telomerase activity will affect:

- 1) The rate of cell growth [0]
- 2) Cell death [0]
- 3) The number of cell divisions a cell is capable of undergoing [100]
- 4) Cell survival [0]
- 5) RNA synthesis [0]

The telomere is a DNA sequence at the end of each chromosome which becomes progressively shorter with each division the cell undergoes. When it is reduced to a critical length the cell is not capable of dividing, the enzyme telomerase is able to lengthen the telomere thus preventing this occurring.

41- Which of the following haematological disorders is inherited as an autosomal recessive condition?

- 1) Antithrombin III deficiency [0]
- 2) Protein C deficiency [0]
- 3) Glucose-6-phosphate dehydrogenase deficiency [0]
- 4) Pyruvate kinase deficiency [100]
- 5) Acute intermittent porphyria [0]

Anti-thrombin 3 (AT3) is a plasma inhibitor protein that blocks the enzymatic activity of some serine proteases coagulation factors. The activity of this inhibitor is increased by heparin. AT3 is synthesised by the liver, is not Vitamin K dependent, and can be consumed during DIC. Normal newborns have a reduced activity. Congenital AT3 deficiency is an autosomal dominant. Treatment of thrombotic in these events in these patients may be difficult.

Protein C is an inhibitor that once activated inhibits clot formation and enhances fibrinolysis. It is liver synthesised and Vitamin K dependent. Protein C is converted to an active enzyme by a thrombin-thrombomodulin complex on the endothelial cell surface. Activated protein C inhibits a plasminogen activator inhibitor, which results in enhanced fibrinolysis, and, with protein S as a co-factor, inhibits the clotting of the activated factors 5 and 8 by limited proteolysis. Activated protein C thus controls the conversion of factor 10 to 10a and prothrombin to thrombin. Congenital deficiency is an autosomal dominant trait. Acquired deficiency may occur in association with infection.

Glucose-6-phosphate dehydrogenase deficiency is the most important disease of the pentose phosphate pathway, and is responsible 2 clinical syndromes: an episodic haemolytic anaemia induced by infections or certain drugs, and a spontaneous chronic non-spherocytic haemolytic anaemia. The deficiency is X-linked, and heterozygous females are resistant to falciparum infections. There are a large number of abnormal alleles causing disease of vastly different severity.

Pyruvate kinase deficiency is a rare congenital haemolytic anaemia inherited as an autosomal recessive. Generation of ATP within the red cell is impaired resulting in an abnormally high concentration of 2,3-DPG in the red cell, which inhibits the enzymes of the pentose phosphate pathway. Clinical manifestations vary from severe neonatal haemolysis, to a mild well compensated haemolysis first noted in adulthood.

Acute intermittent porphyria is an autosomal dominant disorder resulting from partial porphobilinogen deaminase deficiency in the cytosol of all tissues including erythrocytes. Clinical expression of the disease is linked to environmental or acquired factors such as nutritional status, drugs, steroid or chemicals. The major abnormality is of the peripheral, autonomic or CNS. Major symptoms are abdominal pain, nausea, vomiting, constipation or diarrhoea. In severe cases the urine develops a port wine colour due to the high content of porphobilin, an auto-oxidation product of PBG. Hypertension and neuropathy are common, with muscle weakness, cranial nerve abnormality and seizures.

42- A 20 year old female patient is referred with primary amenorrhoea. Investigations reveal a 46 XY karyotype. Which of the following concerning the condition is true?

- 1) It is likely that her mother received stilboestrel in pregnancy [0]
- 2) It is likely that her mother received Carbimazole for thyrotoxicosis during pregnancy [0]
- 3) Low testosterone and oestradiol concentrations would be expected [0]
- 4) The diagnosis is likely to be testicular feminisation syndrome [100]
- 5) The diagnosis is Noonan's syndrome [0]

A female phenotype can occur in testicular feminisation, a condition associated with androgen insensitivity due to an androgen receptor defect. Stilboestrel therapy has been associated with the induction of latent tumours and to influence sexual behaviour but is not associated with abnormalities of sexual identity. In Noonan's syndrome, infants are males but physical features resemble that found in Turner's syndrome. Neither prednisolone nor maternal thyrotoxicosis would cause gender mal-assignment problems.

43- Which ONE of the following is a recognised feature of achondroplasia?

- 1) Autosomal recessive inheritance [0]
- 2) May be diagnosed radiologically at birth [100]
- 3) Increased liability to pathological fractures [0]
- 4) Shortened spine [0]
- 5) Subfertility [0]

ACHONDROPLASIA is an autosomal dominant condition and one of the commonest forms of inherited dwarfism. Epiphyseal dysplasia - thin zone of cartilage cells, diminished columnar arrangement short thick bones, spinal length almost always normal. Features - short limbs, normal trunk, large head, saddle nose, exaggerated lumbar lordosis normal mental and sexual development, spinal problems. Homozygotes - neonatal death (Harrisons)

44- Restriction enzymes:

- 1) Cut DNA [100]
- 2) Join two pieces of DNA together [0]
- 3) Synthesize DNA [0]
- 4) Degrade DNA [0]
- 5) Are involved in cell cycle arrest [0]

Restriction enzymes cut DNA at sequences specific for each restriction enzyme, they are vital tools for molecular biology and molecular genetic research.

45- The following is true about Cystic Fibrosis:

- 1) Is an autosomal dominant condition. [0]
- 2) Is due to mutation of CFTR gene on chromosome 17 [0]
- 3) Skin test may be positive for aspergillus [100]
- 4) Median survival rate is 10 to 15 years. [0]
- 5) Is a cause of mental retardation. [0]

Cystic fibrosis is an autosomal recessive condition and is due to mutation of CFTR gene on chromosome 7. 20% develop bronchopulmonary aspergillosis. Median survival rate is 25 to 35 years and is currently improving.

46- The incidence of Down syndrome in children born to women aged less than 30 years is

- 1) 1:600 [0]
- 2) 1:800 [0]
- 3) 1: 1000 [0]
- 4) 1:1200 [100]
- 5) 1:1400 [0]

Maternal age also affects incidence of hydrocephalus, anencephaly and achondroplasia.

47- A routine ultrasound at 18 weeks gestation in a diabetic mother reveals a male foetus with an endocardial cushion defect. Other abnormalities include increased nuchal thickening and a "double bubble" sign. Which of the following conditions is most likely to have contributed to this set of findings:

- 1) Maternal use of ACE inhibitor [0]
- 2) Marfan syndrome [0]
- 3) Maternal folate deficiency [0]
- 4) Trisomy 21 [100]
- 5) Congenital syphilis [0]

Diabetic mothers are more likely to have children with congenital abnormalities depending on pre-conception, and first trimester blood sugar control. 40% of Down's syndrome babies have atrioventricular septal defects as in this foetus. The double bubble sign suggests duodenal atresia which again suggests Down's syndrome. GI malformations occur in 6% of Down's patients - most commonly duodenal atresia and Hirschsprung's disease.

48- A 40 year old male is diagnosed with Dystrophia myotonica. Which one of the following features would be expected in this patient?

- 1) Autosomal recessive inheritance [0]

- 2) Cataracts [100]
- 3) Fasciculations would predominate [0]
- 4) Progressive external ophthalmoplegia [0]
- 5) Preserved tendon reflexes despite muscle wasting [0]

Dystrophia myotonica is an autosomal dominant condition with variable penetrance. Symptoms characteristically begin from the age of 20-30 with weakness and myotonia. Cataracts, Ptosis, Frontal baldness, gynaecomastia, diabetes, reduced reflexes with myotonia are features. Progressive external ophthalmoplegia is a feature of Ocular muscular dystrophy. c-20-30 years, e-Lost.

Immunology

1- Which of the following is true of the the T cell response to antigen?

- 1) A process of affinity maturation of the T cell receptor occurs. [0]
- 2) Intact antigen is presented in association with self MHC molecules. [0]
- 3) Co-operation with other cell types is required for T cell recognition of antigen. [100]
- 4) gamma/delta + T cells respond to antigen presented in association with MHC class II molecules. [0]
- 5) Interactions of the TcR with an appropriate Ag/MHC complex activates a resting T cell. [0]

a) Affinity maturation in an ongoing immune response is a feature of the antibody response. There is no evidence that a similar process occurs in the T cell response. b) MHC molecules present short antigen-derived peptides, not the intact antigen. c) T cells recognise antigen only when presented by (self) MHC molecules on an antigen presenting cell. d) MHC class II molecules present antigen to CD4+, alpha/beta+ T cells. It is still not clear how gamma/delta+ T cells recognise antigen, however most gamma/delta+ T cells do not appear to be restricted by (self) MHC molecules. e) Additional 'costimulatory' signals are required to activate a resting T cell. Interaction of the TcR of a resting T cell with an appropriate Ag/MHC complex in the absence of costimulatory signals may lead to the induction of anergy. (c) Dr Alan Cann

2- Anti-neutrophilic cytoplasmic autoantibodies:

- 1) positive only in Wegener's syndrome associated with renal disease [0]
- 2) cause neutropenia in SLE [0]
- 3) present in inflammatory bowel disease [100]
- 4) increased in systemic lupus erythematosus [0]
- 5) ANCA positive glomerulonephritis characteristically causes nephrotic syndrome [0]

85% of untreated subjects with Wegener's will have c-ANCA, and those with limited disease are less likely to have positive serology. p-ANCA is present in approximately 70% with ulcerative colitis and less than 20% of Crohn's patients. Neither p nor c-ANCA is typical of SLE. Initial renal damage causes proteinuria (focal proliferative glomerulonephritis) but renal function can deteriorate rapidly, with development of acute focal necrotising glomerulonephritis).

3- Which one of the following is true of IgE?

- 1) Is present in plasma in the same concentration as IgG [0]
- 2) Is increased acutely in an asthmatic attack [0]
- 3) Crosses the normal placenta [0]
- 4) Is increased in the serum of atopic individuals [100]
- 5) Is involved in type 2 hypersensitivity [0]

IgG is the predominant form of immunoglobulin in plasma at a concentration around 10,000 times that of IgE. IgG crosses the placenta to confer immunity to the fetus but IgE does not. IgE is involved in arming mast cells and basophils. IgE causes mast cells to release vasoactive amines, such as histamine, producing an inflammatory response which can result in a type I hypersensitivity reaction. IgE is responsible for allergen-mediated diseases such as anaphylaxis, asthma and atopy. Total serum IgE is frequently increased in those with atopy but serum IgE does not rise acutely during an asthmatic attack.

4- Which of the following statements is correct of hepatitis C virus infection?

- 1) Cell cultures of virus are routinely used to assess response to drug therapy [0]
- 2) High antibody titres are an indication for therapy [0]
- 3) Less than 5% of cases lead to chronic infection [0]
- 4) More likely to be transmitted by the sexual route than hepatitis B virus [0]
- 5) Treatment with ribavirin and interferon alpha is more effective than interferon alpha alone [100]

In hepatitis C infection the criteria for treatment are abnormal liver function tests and detectable hepatitis C RNA in plasma, with evidence of moderate inflammation on liver biopsy. Response to therapy is determined by normalisation of hepatic transaminases and undetectability of hepatitis C RNA in plasma. Hepatitis C is generally transmitted by inoculation or vertically from mother-to-child. In contrast to hepatitis B, sexual transmission is uncommon. Around 85% of acute hepatitis C infections lead to chronic infection. Treatment with interferon alpha alone has around a 10-15% success rate in achieving long-term undetectability of plasma hepatitis C RNA. Combination treatment with ribavirin and interferon alpha has been found to have approximately a 45% success rate.

5- In HIV disease, patients first become susceptible to infection with *Pneumocystis carinii* when the CD4 cell count falls to:

- 1) <1000 cells/mm³ [0]
- 2) <500 cells/mm³ [0]
- 3) <350 cells/mm³ [0]
- 4) <200 cells/mm³ [100]
- 5) <50 cells/mm³ [0]

6- Which of the following is true of BCG vaccination?

- 1) is contraindicated in neonates [0]
- 2) is a killed polysaccharide antigen vaccine [0]
- 3) should be given to all children who have a strongly positive tuberculin test [0]
- 4) is presently routinely offered in the UK at age 16 years [0]

5) Provides protection against leprosy [100]

a - BCG vaccine may given to newborns at high risk of exposure. b - The BCG vaccine is an attenuated strain - it provides approximately 70% protection. c - It should NOT be given to these children. A low reactivity Heaf test (grade 0 - 1) should be documented before administration. d- BCG is given at Comprehensive school entry (age 11 - 13). e - It has also found a use in stimulating the immune system for the treatment of some cancers.

7- A 50 year old African American woman presents with episodic toe and finger problems characterized by pallor, cyanosis, suffusion and pain of the fingers and toes in response to cold. She later develops difficulty in swallowing and dyspnoea. Which of the following immunological investigations is the most specific for this lady's condition:

- 1) Topoisomerase I [0]
- 2) Anticentromere antibody [0]
- 3) Antitopoisomerase I (Scl-70) antibody [100]
- 4) Rheumatoid factor [0]
- 5) Anti-ds DNA antibody [0]

This lady has systemic sclerosis as suggested by the dyspnoea (lung fibrosis, dysphagia (oesophageal involvement) and Raynaud's. The lung involvement would argue against this being CREST and hence positive anticentromere antibodies. . SCL-70 antigen (topoisomerase I) is a DNA-binding protein sensitive to nucleases and is typically found in progressive systemic sclerosis.

8- Which of the following micro-organisms is generally sensitive to Benzylpenicillin?

- 1) Bordetella pertussis [0]
- 2) Cryptococcus neoformans [0]
- 3) Mycoplasma pneumoniae [0]
- 4) Streptococcus Pneumoniae [100]
- 5) Streptococcus Viridans [0]

Penicillin binds to specific penicillin-binding proteins (PBP's) in the cell wall, mainly of gram positive organisms. Penicillin resistance is usually due to production of altered PBPs or beta-lactamases which leave the ... Penicillin is mainly useful for Group A Strep., Group B Strep., meningococcal and pneumococcal infections, though and anthrax are also sensitive. Pneumococci with modified PBPs are an increasing problem.

9- Regarding the epidemiology of infections, which of the following statements is true?

- 1) Resistant vivax malaria is a major problem in Kenya. [0]
- 2) Diphtheria has been eradicated in most parts of the world. [0]
- 3) Polio has been eradicated in most parts of the world. [100]
- 4) Tetanus has been eradicated in most parts of the world. [0]
- 5) The AIDS epidemic seems to be declining worldwide. [0]

Falciparum is the major resistance problem in sub-Saharan Africa. Most vivax is Chloroquine sensitive, though resistant strains are appearing in New Guinea and Indonesia. Diphtheria is still prevalent in many parts of the world. An upsurge in polio is now nearing eradication. Tetanus is still common. AIDS is increasing inexorably.

10- Which of the following statements is true of Xenotransplantation?

- 1) is the transfer of organs between species [100]
- 2) is the transfer of tissue grown in-vitro [0]
- 3) has not yet been performed in humans [0]
- 4) requires a close HLA match [0]
- 5) is characterised by a vigorous early cell-mediated immune response [0]

Xenotransplantation is the transfer of organs between species - particularly the transfer of animal organs to humans. Compare this with allotransplantation which is the transfer of organs within the same species.

There have already been several documented cases of xenotransplantation - baboon heart, chimpanzee kidneys. A close HLA match is not possible of course unless a transgenic species is used that express human major histocompatibility complexes (HLA). Early immune response is humoral - IgM.

11- A 65-year-old man has IgG paraproteinaemia with plasma cells in his bone marrow aspirate. Which of the following is most likely with his underlying condition?

- 1) Renal failure is the commonest cause of death [0]
- 2) Sclerotic bone lesions are characteristic [0]
- 3) Biphosphonates are first line therapy for the treatment of associated hypercalcaemia [0]
- 4) Treatment with interferon alpha improves survival [100]
- 5) bone resorption is due to increased osteoblast activity [0]

Infection is the commonest cause of death in multiple myeloma because of immunoparesis. Lytic bone lesions commonly occur due to increased osteoclastic activity, rarely sclerotic lesions occur. Vigorous hydration and diuresis are cornerstones of the treatment of severe hypercalcaemia in myeloma. Interferon alpha is the only agent found to prolong plateau phase of disease (used in maintenance therapy).

12- Regarding bronchial asthma

- 1) Mendelian recessive inheritance [0]
- 2) Leukotriene concentrations are influenced by genetic factors [0]
- 3) Similar concordance in monozygotic and dizygotic twins [0]
- 4) Genetic linkage is to a single chromosome 13 [0]
- 5) There is a contribution from HLA alleles [100]

There may be genetic linkage of atopic trait to chromosome 11, with association between response to antigen and HLA haplotype. IgE concentrations are influenced by genetic factors.

13- A 60-year-old man with breathlessness, fever and headache is suspected of having Farmers Lung. A CXR shows diffuse nodular shadowing predominantly in the mid and lower zones. What would be the most useful diagnostic test?

- 1) Blood Culture [0]
- 2) Sputum Culture [0]
- 3) Serum precipitating antibodies to *Micropolyspora faeni* [100]
- 4) Serum Precipitating antibodies to *Aspergillus clavatus* [0]
- 5) Serum Precipitating antibodies to *Cryptostroma corticale* [0]

The diagnosis of Extrinsic Allergic Alveolitis is based on characteristic clinical, radiological and functional changes and confirmed by demonstration of precipitating antibodies (precipitins) in the patients serum to the causal antigen. In Farmers lung precipitins to *M. faeni* or *Thermoactinomyces vulgaris* are found in 75-100% of cases during an acute episode. *A. clavatus* is the antigen causing Malt Workers lung and *C. corticale* the antigen causing Maple Bark Strippers Lung.

14- Leukotrienes:

- 1) Are formed from the cyclooxygenase pathway [0]
- 2) Are synthesized by fibroblasts [0]
- 3) Decrease vascular permeability [0]
- 4) Leukotriene D4 has been identified as SRS-A which causes bronchial wall smooth muscle relaxation [0]
- 5) Stimulate mucus secretion [100]

Leukotrienes are synthesized by leucocytes. They are mediators of allergic reaction. They increase vascular permeability and attract neutrophils and eosinophils to inflammatory sites. Leukotrienes are synthesised via the lipoxygenase pathway. Leukotriene D4 has been identified as SRS-A which causes bronchial wall and intestinal smooth muscle contraction (not dilatation). Leukotrienes also stimulate mucus production, an important consideration in the pathophysiology of bronchial asthma.

15- Which one of the following statements regarding T cells in their recognition of antigen is correct:

- 1) By TcR interaction with antigen in the extracellular fluid. [0]
- 2) As conformational epitope at the cell surface. [0]
- 3) As linear peptide sequences bound covalently to self MHC class I or class II at the cell surface. [0]
- 4) Derived from protein only [100]
- 5) Only when presented by "professional" antigen presenting cells. [0]

TCR's interact with a complex of antigenic peptide bound to MHC molecules and presented at the cell surface of the antigen presenting cell. T cells recognise antigen as linear peptide epitopes associated with self MHC molecules. Peptides associate non-covalently with MHC class I or class II molecules at the cell surface. T cells recognise peptides, therefore T cell antigens are derived from proteins, but not from

carbohydrate or lipid molecules. 'Professional' antigen presenting cells are required for the induction phase of the T cell response, but activated effector T cells can recognise antigen presented by MHC molecules on a wide range of cell types (for example, CTL recognition of virally infected target cells). (c) Dr Alan Cann

16- Which of the following concerning IgG is correct?

- 1) It has a molecular weight of 50,000 kd. [0]
- 2) It is monovalent. [0]
- 3) It comprises the majority of circulating antibody in serum. [100]
- 4) It differs from other isotypes in not being able to cross the placental barrier. [0]
- 5) It is the major antibody produced during the primary response. [0]

a) Each light chain has a MW of 25,000 and each H chain a MW of 50,000. Therefore, since the whole molecule consists of 2 L and 2 H chains, the MW is 150,000 kd. b) It exists as a monomer with 2 Fab portions, each of which can interact with an antigenic determinant. Therefore it is divalent. c) Normal range 8-19 g/l. Next is IgA, 1-5 g/l, followed by IgM 0.5- 2 g/l. d) It is in fact the only antibody capable of crossing the placental barrier, which it does through gaining attachment via its Fc portion. e) It is the major antibody produced in the secondary immune response. IgM is the major antibody produced during the primary response. (c) Dr Alan Cann

17- Which one of the following statements concerning T-lymphocytes is correct?

- 1) Are the primary host response in bacterial infection [0]
- 2) Compose the majority of lymphocytes in plasma [100]
- 3) Are infected by Epstein-Barr virus in infectious mononucleosis [0]
- 4) produce IgG [0]
- 5) T cell lymphoma has a better prognosis [0]

The primary host response to bacterial infections is dependent on mononuclear phagocytes and neutrophils. T-lymphocytes are involved in cell-mediated acquired immune responses, whereas B-lymphocytes are involved in humoral immunity and produce immunoglobulins. T lymphocytes compose the majority of circulating lymphocytes in plasma. Epstein-Barr virus infects B-lymphocytes and squamous epithelial cells of the oropharynx. The virus can transform B cells and epithelial cells to produce Burkitt's lymphoma, a subset of Hodgkin's lymphoma, nasopharyngeal carcinoma and oral hairy leukoplakia. T cell lymphoma makes up about 10-20% of non-Hodgkin's lymphomas and has a worse prognosis than B cell lymphoma.

18- Which of the following statements is true of the immunology of rheumatoid arthritis?

- 1) It is an example of an organ-specific disease. [0]
 - 2) Joint damage is the consequence of mast cell degranulation. [0]
 - 3) It is likely that joint specific Antigens have been sequestered during the time when immunological tolerance was being established. [0]
 - 4) Rheumatoid factor is detected by a test utilising the patients B lymphocytes. [0]
 - 5) Rheumatoid factor is an antibody with reactivity to the heavy chain of IgG. [100]
-

Rheumatoid arthritis is associated with several antibodies such as rheumatoid factor, collagen antibody, capable of reaction at sites other than the joints. Additionally, the disease is not confined to the joints. Damage is mediated by several means, including macrophages activated by CD4+ T cells, and by complement fixing immune complexes. There is no evidence for the creation of joint-specific antibodies in development. All the components of the joint are present during fetal life. The Rheumatoid factor test utilizes the patient's serum, to agglutinate cells coated with antibody. Rheumatoid factor (RF) is an antibody whose specificity is directed to a domain situated within the Fc portion of IgG. The rheumatoid factor may be of IgM, IgG or IgA class. The conventional (agglutination) test, detects only IgM RF.

19- A 75 year old man has a history of Chronic Lymphocytic Leukaemia. He has had treatment with several courses of chemotherapy and has now been admitted to hospital with pneumonia. His past medical history revealed that he had suffered several previous upper respiratory tract infections over the previous six months.

Which of the following components of his immune system is likely to be deficient?

- 1) Complement [0]
- 2) Immunoglobulin G [100]
- 3) Macrophages [0]
- 4) Mast cells [0]
- 5) T lymphocytes [0]

CLL is commonly complicated by panhypogammaglobulinaemia. Although IV immunoglobulin prevents recurrent infections it does not prolong survival.

20- A 7 month old boy is presented to a doctor by his parents with symptoms of recurrent upper respiratory tract infections. No other members of the family suffer from any similar infections. Physical examination showed mild facial hypoplasia. Biochemistry investigations revealed hypocalcaemia. Microbiological investigations were normal and immunoglobulins were within normal limits. The infant's immune function would show the following deficiency:

- 1) Complement Deficiency [0]
- 2) B cell number and function [0]
- 3) T cell number and function [100]
- 4) Plasma Cell [0]
- 5) Macrophage number and function [0]

This child suffers from DiGeorge's syndrome. Patients with DiGeorge's Syndrome often have near normal levels of immunoglobulins but with significant decreases in T cell numbers and relative increase in the percentage of B cells.

21- Which of the following cell types have a prime role in recognizing and destroying virus infected cells in an HLA class I-restricted manner.

- 1) Macrophages [0]
- 2) B cells [0]
- 3) Dendritic cells [0]
- 4) Platelets [0]

5) CD8+ T lymphocytes [100]

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CD8+ T lymphocytes are otherwise known as cytotoxic T lymphocytes. The T cell receptor on the surface of the CD8+ T cell recognizes virus peptides in the context of self HLA class I molecules on the surface of virus infected antigen presenting cells. The infected cell is then lysed. Dendritic cells are professional antigen presenting cells presenting antigens to CD4+ helper cells and CD8+ T cells, but have no cytotoxic potential. B cells produce antibodies. Macrophages are also antigen presenting cells but also involve in recognition and eradication of certain intracellular pathogens but not a non-essential resident member. Following activation of T cells by antigen presenting cells, they become cytotoxic and kill the infected cells.

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 elevated but not a paraprotein. P02 may be decreased particularly with exercise.
 Arestrictive pattern on LF studies is seen. (Dr Shu Ho)

23- Deficiency of T-cells is found in

- 1) Wiscott-Aldrich syndrome [100]
- 2) hereditary angio-oedema [0]
- 3) chronic granulamatous disease [0]
- 4) Chediak-Higashi syndrome [0]
- 5) congenital agammaglobulinaemia [0]

 congenital agammaglobulinaemia = antibody deficiency (X-linked) hereditary angio-
 oedema = C1 esterase deficiency (autosomal dominant) chronic granulamatous
 disease = disorder of oxidative mechanism - susceptible to pyogenic/fungal infections.
 Deficiency of T-cells is found in also found in ataxia telengiectasia. Chediak-Higashi
 syndrome is autosomal recessive and is characterized by defective fusion with the
 phagosome in phagocytes.

24- 1. Mast cells:

- 1) Do not contain heparin [0]
- 2) Degranulation releases lytic enzymes and inflammatory mediators from storage granules [100]
- 3) Are lipophilic cells involved in inflammatory and immune responses [0]
- 4) Cross-linkage of surface IgA molecules by antigen may cause an anaphylactic reaction [0]
- 5) Depletion of circulating mast cells can cause mastocytosis [0]

 Mast cells are basophilic cells in the connective and subcutaneous tissues, which are
 involved in inflammatory and immune responses. They contain storage granules that
 contain lytic enzymes (e.g. tryptase) and inflammatory mediators, e.g. histamine,
 heparin, 5-HT, leukotrienes, platelet aggregating factor, leucocyte chemotactic factor
 and hyaluronidase. Release of these mediators occurs during mast cell degranulation,
 which can be triggered by: tissue injury, drugs, complement activation, and foreign
 antigenic material. An anaphylactic reaction occurs when a previously sensitised
 individual is re-exposed to the antigen. It is an IgE mediated immune response.
 Mastocytosis occurs when excess mast cells are present in the circulation or as tissue
 infiltrates.

25- Which of the following statements concerning the thymus is true?

- 1) The majority of cortical thymocytes express either CD4 or CD8. [0]
- 2) CD4/CD8 double positive cells are eliminated by a process of negative selection. [0]
- 3) A proportion of alpha/beta+ thymocytes undergo isotype switching to produce gamma/delta+ T cells. [0]
- 4) Thymocytes whose TcR bind with high affinity to self Ag/MHC complexes are clonally deleted. [100]
- 5) Mature thymocytes express surface IgM and IgD. [0]

Cortical thymocytes are immature forms, and either do not express CD4 or CD8 (double negative cells) or express both CD4 and CD8 (double positive cells). As the cells mature, they pass to the thymic medulla, where they lose expression of either CD4 or CD8, to become single positive cells.

Negative selection occurs at the stage when thymocytes express both CD4 and CD8, but co-expression of these markers does not mediate negative selection. Negative selection occurs when a thymocyte expresses a TcR with high affinity for self antigen:MHC complexes in the thymic micro-environment.

Once a thymocyte has successfully rearranged and expressed an alpha/beta or gamma/delta TcR it is committed to that lineage.

Thymocytes whose TcR bind with high affinity to self Ag/MHC complexes are clonally deleted by a process of negative selection.

B cells express IgM and IgD; T cells do not!

26- Which of the following statements is true about immunological reactions?

- 1) Serum sickness is caused by a type II reaction. [0]
- 2) Grave's Disease is caused by a type IV reaction. [0]
- 3) Angio-neurotic oedema is the most severe form of type I reaction. [0]
- 4) Urticaria usually responds to Cimetidine. [0]
- 5) Deficiencies in the terminal components of complement increase the risk of meningococcal disease. [100]

Serum sickness is due to circulating antibody-antigen complexes (Type III). Grave's Disease is due to stimulating antibody (Type VI). The most severe variety of Type I reaction is anaphylaxis, with angio-oedema an intermediate reaction associated with wheeze and swelling of the lips and severe urticaria. These reactions are mediated by histamine 1 receptor stimulation. Congenital C1 inhibitor deficiency is also caused hereditary angio-oedema. Deficiencies in C1r, s, and 2-4 result in vasculitides; while deficiencies in C2, 3 and 5-8 are associated with an increased risk of septicaemia.

Metabolism

1- Polymyalgia rheumatica associated with

- 1) raised creatinine kinase [0]
- 2) increased alkaline phosphatase [100]

- 3) sudden loss of vision in one eye [0]
- 4) shoulder and pelvic girdle pain in 40 year old man [0]
- 5) erythema nodosum [0]

Liver enzymes elevated in most patients. Visual disturbances suggestive of temporal arteritis, due to ischaemic changes in ciliary arteries (optic neuritis/infarction) and less commonly due to central artery occlusion. Raised CK in polymyositis. PMR is rare before the age of 50 years.

2- A 73 year old male presented with an acute attack of gout in his left knee.

What is the most likely underlying metabolic cause?

- 1) decreased renal excretion of uric acid [100]
- 2) endogenous overproduction of uric acid [0]
- 3) excessive dietary purine intake [0]
- 4) lactic acidosis [0]
- 5) starvation [0]

The aetiology of gout can broadly be divided into cases where there is underexcretion of urate via the kidney (90%) or endogenous overproduction of uric acid (10%) although in practical terms the distinction is rarely made as it allopurinol is the mainstay of long-term treatment (not during the acute attack!) in both groups. In a 73 year old man it is almost certainly reduced renal excretion due to deteriorating renal function and possibly diuretic use. Excessive dietary intake of purines is unlikely to be the main cause in this case.

3- Primary hyperparathyroidism may occur in association with the following conditions

- 1) Chronic renal failure [0]
- 2) Vitamin D deficiency [0]
- 3) Gastrinoma [100]
- 4) Autoimmune polyendocrine syndrome [0]
- 5) Sjogren's syndrome [0]

The association of primary hyperparathyroidism and a gastrinoma would suggest a diagnosis of multiple endocrine neoplasia type 1. CRF causes secondary or tertiary hyperparathyroidism, with vit D deficiency causing secondary hyperparathyroidism. There is no association with Sjogren's.

4- With which of the following is hyperprolactinaemia associated?

- 1) Cabergoline therapy [0]
 - 2) Depression [0]
 - 3) Fluoxetine therapy [100]
 - 4) Hyperthyroidism [0]
 - 5) Sheehan's syndrome [0]
-

Hyperprolactinaemia may be manifest by a milky discharge from the breasts. Causes include, prolactinoma, hypothyroidism (far increased TRH), Non-functional tumour with stalk compression and drugs in particular dopamine antagonists such as chlorpromazine, haloperidol and domperidone. Pregnancy is a particularly common cause of hyperprolactinaemia. Other drugs that are occasionally reported include SSRIs. PCOs is often associated with idiopathic hyperprolactinaemia.

5- Metabolic alkalosis is characteristically found in which of the following?

- 1) An infusion of sodium chloride [0]
- 2) Ileostomy [0]
- 3) Mineralocorticoid deficiency [0]
- 4) Pyloric stenosis [100]
- 5) Salicylate poisoning [0]

Pyloric stenosis is associated with vomiting and the loss of stomach content – hence a metabolic alkalosis. Mineralocorticoid excess (Conn's syndrome) is associated with a metabolic alkalosis. Ileostomy may be associated with a loss of bicarbonate ions and hence acidosis. Salicylates are themselves acidic and produce a metabolic acidosis. A sodium chloride infusion is neutral and does not alter pH.

6- Osteomalacia may be expected in

- 1) Sarcoidosis [0]
- 2) Auto-immune adrenalitis [0]
- 3) Pseudo-hypoparathyroidism [0]
- 4) Pernicious anaemia [0]
- 5) Mercury poisoning [100]

Osteomalacia may occur with vitamin D deficiency. Mercury poisoning or any heavy metal poisoning causes an acquired Fanconi syndrome with distal renal tubular acidosis.

7- Which of the following suggests a diagnosis of familial combined hyperlipidaemia (FCHL) rather than heterozygous familial hypercholesterolaemia (FH)?

- 1) Tendon xanthomas [0]
- 2) Presence of glucose intolerance [100]
- 3) Strong family history of premature coronary artery disease [0]
- 4) Presence of arcus senilis [0]
- 5) Absence of hyperuricaemia [0]

The genetic dislipidaemias occur in one third of patients who have suffered from their first myocardial infarction below the age of 50 years in men. The commonest is familial combined hyperlipidaemia (two thirds), with a fifth due to familial hypercholesterolaemia. The former can be diagnosed only on family studies, and there is elevation of fasting plasma triglycerides not associated with hypercylomicronaemia. It is autosomal dominant, and some family members may have hypercylomicronaemia. Only 20% of children have elevated triglycerides before the age of 25. Obesity, insulin resistance, hyperinsulinaemia, glucose intolerance, and

hyperuricaemia are associated. Heterozygous familial hypercholesterolaemia is dominantly inherited, and results from defects in the LDL receptor. The most important clinical manifestation is premature coronary artery disease, particularly with onset between the third or fourth decade. Tendon xanthomata and arcus cornea are rarely present in children, but are very important signs to identify.

8- Which of the following is a characteristic feature of acute intermittent porphyria?

- 1) autosomal recessive inheritance [0]
- 2) excessive faecal protoporphyrin excretion [0]
- 3) excessive urinary porphobilinogen between acute attacks [100]
- 4) hyponatraemia during attacks [0]
- 5) photosensitivity [0]

Features of acute intermittent porphyria include urinary porphobilinogen excretion raised between attacks, hyponatraemia during an acute attack and autosomal dominant inheritance.

ACUTE INTERMITTENT PORPHYRIA-features

autosomal dominant expressed more in girls
most common in Sweden
attacks common in late pregnancy + puerperium
acute attacks characterised by
colicky abdo pain 95%, muscle aches 50%
psychological symptoms 50%
vomiting 80%, constipation 75%, diarrhoea 10%
SIADH, peripheral neuropathy 66%
dec. tendon jerks 50%
inc. BP+HR, seizures 10%
proteinuria 10%
many precipitating factors
urinary porphobilinogen excretion raised between attacks

9- Which of the following suggests a diagnosis of Hurler's Syndrome rather than Hunter's Syndrome?

- 1) X-linked inheritance [0]
- 2) Mental retardation [0]
- 3) Skeletal abnormalities [0]
- 4) Cloudy cornea [100]
- 5) Cardiomyopathy [0]

Hunter's Syndrome (MPS-2) is of X-linked inheritance. The cornea are clear. The skeletal involvement tends to be mild with no gibbous present, though scoliosis is often found. Mental retardation and heart involvement are less severe than in Hurler's Syndrome. Hurler's Syndrome (MPS0) is autosomal recessive in inheritance and is associated with cloudy cornea. There is severe mental retardation, and gibbous deformation of the spine is characteristic. There is the characteristic coarse facies with hepatosplenomegaly.

10 -With respect to lipoprotein transport and metabolism in the body, the following statements are correct EXCEPT:

- 1) Arterial walls contain cells with LDL receptors. [0]
- 2) Cholesterol is required for the formation of red blood cell membranes. [0]
- 3) Chylomicrons are synthesized in the liver. [100]
- 4) HDL is assembled in the extracellular space. [0]
- 5) VLDL transformation to LDL occurs in adipose tissue. [0]

Chylomicrons are formed in the gut from exogenous triacylglycerols and cholesterol. They are released into the lymph and thereby enter the blood. They are not formed in the liver.

11- Which of the following conditions may be detectable by growth monitoring?

- 1) Hyperthyroidism [0]
- 2) Hypothyroidism [100]
- 3) Pseudohypoparathyroidism [0]
- 4) XYY Syndrome [0]
- 5) Insulin dependent diabetes mellitus [0]

Benefits of growth monitoring include:
Early detection of conditions such as:

hypothyroidism.

growth hormone insufficiency.

syndromes: Turners, Russell-Silver, Noonan's, skeletal dysplasias.

growth impairment e.g. coeliac disease, inflammatory bowel disease or chronic renal failure.

intracranial tumours.

short normal children.

children with short stature.

Health promotion: impaired growth may be associated with child abuse or neglect for example.

Focus of interest for parents.

Public health aspects:

secular trend of increasing growth.

linking growth patterns in fetal life and early infancy with adult patterns of disease.

link between height and social circumstances.

12- Which of the following enzyme defects is associated with a characteristic body odour?

- 1) Phenylalanine aminotransferase [0]
- 2) Galactose 0-phosphate-uridyltransferase [0]
- 3) Ornithine transcarbamylase deficiency [0]
- 4) Fumaryl acetoacetase [0]
- 5) Branched chain ketoacid decarboxylase [100]

The following inborn errors of amino acid metabolism are associated with abnormal odours: Glutaric acidemia type II (sweaty feet), hawkinsinuria (swimming pool), isovaleric acidemia (sweaty feet), maple syrup urine disease (maple syrup), methionine malabsorption (cabbage), multiple carboxylase deficiency (tomcat urine), oasthouse urine disease (hops-like), phenylketonuria (mousy or musty), trimethylaminuria (rotting fish), tyrosinaemia (rancid, fishy or cabbage-like). In addition, ketones may be smelt in diabetic ketoacidosis, and some intermediary disorders of fatty acid metabolism can result in fishy smells. The general rule is that if a child smells peculiar he requires a metabolic work-up.

13- An 16-year-old man presents with polyuria and polydipsia. Which of the following may confirm the diagnosis of diabetes mellitus?

- 1) A random plasma glucose of >7.5 mmol/L [0]
- 2) A finding of 3+ ketonuria [0]
- 3) An HbA1c of 7.0% [0]
- 4) A fasting plasma glucose of 7.5 mmol/L [100]
- 5) An abnormal glucose tolerance test [0]

The diagnosis is usually relatively easy to confirm in a symptomatic subject. A random glucose of >11.1 mmol/L or a fasting glucose of >7.0 mmol/L would be regarded as confirmatory. There is usually glycosuria in addition to ketonuria. Isolated ketonuria suggests fasting. A raised glycosolated haemoglobin (HbA1c) is also highly suggestive but not diagnostic. A glucose tolerance test is rarely needed.

14- Which of the following is a characteristic feature of familial hypercholesterolaemia?

- 1) Autosomal dominant inheritance [100]
- 2) elevated chylomicrons [0]
- 3) hypertriglyceridaemia [0]
- 4) increased expression of LDL receptors [0]
- 5) Palmar xanthomas [0]

Familial hypercholesterolaemia is an autosomal dominant condition manifest by increased LDL concentrations (not chylomicrons) due to constitutional abnormalities and reduced numbers of the LDL receptor. Hypertriglyceridaemia is not characteristic and HDL concentrations are usually decreased. Tendon xanthomata are characteristic and the condition is associated with a premature cardiovascular mortality.

15- Which of the following has a known association with phenylketonuria?

- 1) Presentation in the second year of life with absence seizures. [0]
- 2) The association of red hair and brown eyes. [0]
- 3) Normal development. [0]
- 4) Musty odour. [100]
- 5) Response of some patients to piridoxine. [0]

Phenylketonuria is a quarter as common as congenital hypothyroidism, with an incidence of 1:10,000 live births. It is due either to phenylalanine hydroxylase

deficiency or problems with synthesis or recycling of the bioprine co-factor. The presentation is with infantile spasms or developmental delay between 6 and 12 months of age. Patients may be musty smelling, fair haired and blue eyed and may develop eczema. Treatment is with restriction of dietary phenylalanine, while ensuring sufficient for physical and neurological growth. Co-factor defects are treated with a diet low in phenylalanine and high in neurotransmitter precursors.

Molecular Biology

1- Apoptosis is induced by:

- 1) Activation of caspases [100]
- 2) The MAP kinase pathway [0]
- 3) DNA synthesis [0]
- 4) Antibodies [0]
- 5) Necrosis [0]

A key event in the initiation of apoptosis is the activation of a cascade of cysteine-aspartate specific proteases known as caspases.

2- Phosphorylation of protein tyrosine residues is associated with:

- 1) Cell signalling pathways [100]
- 2) Protein degradation [0]
- 3) Alzheimer's disease [0]
- 4) Protein synthesis [0]
- 5) Creutzfeldt-Jacob Disease [0]

Phosphorylation of specific tyrosine residues of components of cell signalling pathways is often a key event in the activation of the pathway.

3- Two strains of *Escherichia coli* are isolated and both are resistant to ampicillin. Strain A retains its resistance to ampicillin when grown from multiple generations in the absence of ampicillin. However strain B loses its resistance when grown in the absence of ampicillin. Which of the following best explains the loss of antibiotic resistance in strain B?

- 1) Changes in the bacterial DNA gyrase [0]
- 2) Downregulation of the resistance gene [0]
- 3) Loss of a plasmid containing the resistance gene [100]
- 4) Mutations in the resistance gene [0]
- 5) Transposition of another sequence into the resistance gene [0]

Bacteria develop resistance to antibiotics by gaining genes that encode for particular proteins that offer protection to the organism. Sometimes this is by mutation and other times the gene may be acquired from another bacterial species. The genes are usually found in plasmids - circular segments of DNA separate from the bacterial chromosome. Plasmids can easily spread from one bacteria to another - a sort of resistance package that bacteria can share.

4- Apoptosis is the process of programmed cell death and occurs in cells that have damaged DNA. A mediator of this process is a tumour suppressor gene that inhibits mitosis and promotes apoptosis. This gene is:-

- 1) bcl-2 [0]
- 2) caspases [0]
- 3) fas (CD95) [0]
- 4) p53 [100]
- 5) ras [0]

bcl-2 is an inhibitor of apoptosis. fas is a cell receptor and caspases are present in all cells both promote apoptosis but are not tumour suppressor genes. ras is an oncogene.

5- Which of the following is an oncogene?

- 1) The N-Myc gene [100]
- 2) The WT1 (first Wilm's tumour) gene [0]
- 3) The Retinoblastoma gene [0]
- 4) The WT2 (second Wilm's tumour) gene [0]
- 5) The BCRabI translocation (Philadelphia chromosome) [0]

Oncogenes are endogenous human DNA sequences that arise from normal genes called proto-oncogenes. Proto-oncogenes are normally expressed in many cells, particularly during fetal development, and are thought to play an important regulatory role in cell growth and development. Alterations in the proto-oncogene can activate an oncogene, which produces unregulated gene activity, contributing directly to tumorigenesis. Oncogene alterations are important causes of:

Rhabdomyosarcomas (ras oncogene).

Burkitt's lymphoma (C-myc is translocated intact from its normal position on chromosome 8 to chromosome 14).

Neuroblastoma (N-myc proto-oncogene is seen in a proportion of patients with poor prognosis).

They should be contrasted with tumour suppressor genes. In this situation, the genes normally down regulate cell growth, and require inactivation to allow malignant growth. Examples include retinoblastoma.

6- The Polymerase Chain Reaction (PCR) is used to amplify small amounts of DNA for further analysis. First the DNA double helix must be split into two strands. This is achieved by

- 1) alkali solution [0]
- 2) centrifugation [0]
- 3) DNA polymerase [0]
- 4) heating to nearly 100°C [100]
- 5) viral reverse transcriptase [0]

To the small sample of DNA are added two oligonucleotides with sequences that have affinity for both ends of the area of DNA that is being studied. A thermostable DNA polymerase is also added. At 94°C DNA literally melts into two single strands and with cooling the oligonucleotides bind to the areas surrounding the particular area of DNA that is being analysed. These act as primers for the DNA polymerase and a new

double helix of DNA is formed. The cycle is repeated doubling the amount of DNA each time.

7- Protein synthesis occurs within cells. A particular molecule that is produced in the nucleus initiates protein synthesis. This molecule matures in the cytoplasm and binds to the ribosome. This molecule is

- 1) messenger RNA [100]
- 2) ribosomal RNA [0]
- 3) RNA nucleotide [0]
- 4) RNA polymerase [0]
- 5) transfer RNA [0]

Protein synthesis consists of two phases. Transcription is where one strand of the DNA double helix is used as a template by RNA polymerase to synthesize messenger RNA from RNA nucleotides. The mRNA then migrates into the cytoplasm maturing - for example by the splicing of non-coding sequences. Translation occurs when the ribosome binds to mRNA at the start codon and transfer RNA brings amino acids into position along the mRNA template. The ribosome moves from codon to codon along the mRNA producing a polypeptide sequence.

8- Northern blotting is a technique that can be used to detect:

- 1) Antibodies [0]
- 2) DNA [0]
- 3) RNA [100]
- 4) Protein [0]
- 5) Plasmids [0]

Northern blotting is a means of detecting RNA, frequently used to quantify specific mRNA transcript levels.

9- Which of the following statements regarding messenger RNA (mRNA) is correct?

- 1) mRNA never contains introns. [0]
- 2) mRNA is translated into proteins in the nucleus. [0]
- 3) mRNA contains the bases cytosine and thymine. [0]
- 4) reverse transcriptase uses mRNA as a template to produce complementary DNA. [100]
- 5) mRNA is used in the Southern blotting technique. [0]

The structure of mRNA is similar to DNA except that uracil replaces thymine as one of the bases. Both coding (exons) and non-coding regions of DNA are initially transcribed into mRNA. Splicing is required for mature mRNA to be produced only consisting of introns. Translation occurs in the cytoplasm. Southern blotting is a technique that uses denatured fragments of DNA in a gel to bind to DNA probes in order to detect the presence of particular genes or sequences of DNA. The enzyme reverse transcriptase can be used by viruses to insert viral mRNA into the host genome. From Hannam et al. MRCP (Paediatrics) Part 1 MCQs. page 121 © WB Saunders. Reproduced with permission.

10- Transcription RNA (tRNA) has three bases specific for a particular amino acid with which it binds to messenger RNA (mRNA). This specific area of tRNA is called the

- 1) anticodon [100]
- 2) codon [0]
- 3) exon [0]
- 4) intron [0]
- 5) transposon [0]

mRNA has codons which are bound by the anticodons on tRNA during translation of protein synthesis. Exons are non-coding sequences in the mRNA and introns are areas of unknown function. Transposons are genetic sequences that have been transposed from one part of DNA to another.

11- The thyroid hormone receptor is:

- 1) A gated ion channel [0]
- 2) A cell surface receptor [0]
- 3) A cytoplasmic protein [0]
- 4) A G-protein coupled receptor [0]
- 5) A nuclear receptor [100]

The thyroid hormone receptor is a nuclear receptor. When it binds T3 it is able to bind to the thyroid hormone response element (TRE) in the promoter region of thyroid hormone responsive genes and initiates transcription.

12- Proteins known as cyclins:

- 1) Regulate the menstrual cycle [0]
- 2) Are differentially expressed throughout the cell cycle [100]
- 3) Regulate antibody production [0]
- 4) Regulate the cycling of receptors between the cell surface and the cytoplasm [0]
- 5) Regulate DNA transcription [0]

Cyclins are key regulators of the cell cycle, different cyclins are expressed at different stages of the cell cycle.

13- Which of the following is a glycoprotein hormone?

- 1) Growth hormone releasing hormone [0]
- 2) Cortisol [0]
- 3) Thyrotropin releasing hormone (TRH) [0]
- 4) Thyrotropin (TSH) [100]
- 5) Oxytocin [0]

Thyrotropin is glycosylated, cortisol is a steroid hormone and the others are peptide hormones/neuropeptides which as a group are rarely glycosylated.

14- Which ONE of the following have their own self replicating DNA?

- 1) Golgi body [0]
- 2) Lysosomes [0]
- 3) mitochondria [100]
- 4) Peroxisome [0]
- 5) Rough Endoplasmic Reticulum [0]

Abnormalities of Mitochondrial DNA are associated with inherited conditions such as Leber's OA, MELAS syndrome and DIDMOAD(Dr Vajira H. W. Dissanayake)

15- A Plasmid is best described as

- 1) a recombinant section of DNA [0]
- 2) a small viral particle [0]
- 3) bacterial DNA separate from the chromosome [100]
- 4) consist of multiple copies of a single gene [0]
- 5) having multiple origins of replication [25]

Plasmids are circular molecules of bacterial DNA separate from the bacterial chromosome. They are usually small consisting of a few thousand base pairs, carry one or a few genes, and have a single origin of replication. Genes on plasmids with multiple copies are usually expressed at higher levels. In nature these genes often encode for proteins such as those needed for bacterial resistance. Plasmids can be used to clone genes by splicing a particular gene into a plasmid and then allowing the bacteria to multiply - this is then called recombinant plasmid DNA.

16- Which ONE of the following is true concerning Antidiuretic hormone (ADH)?

- 1) Carbamazepine potentiates it's release [100]
- 2) Ethanol potentiates it's release [0]
- 3) It circulates in the blood bound to neurohypophysin [0]
- 4) It is a cyclic octapeptide [0]
- 5) It is synthesised in the posterior pituitary [0]

ADH is a nonapeptide manufactured in the paraventricular and supra-optic nuclei of the hypothalamus and released from the posterior pituitary. It acts on the collecting ducts improving water permeability and hence water retention. Carbamazepine as well as other agents such as thiazides and SSRIs may potentiate its release. Ethanol usually inhibits release.

17- Restriction enzymes:

- 1) Cut DNA [100]
 - 2) Join two pieces of DNA together [0]
 - 3) Synthesize DNA [0]
 - 4) Degrade DNA [0]
 - 5) Are involved in cell cycle arrest [0]
-

Restriction enzymes cut DNA at sequences specific for each restriction enzyme, they are vital tools for molecular biology and molecular genetic research.

18- Reverse transcriptase-PCR is used to amplify:

- 1) Antibodies [0]
- 2) DNA [0]
- 3) RNA [100]
- 4) Protein [0]
- 5) Plasmids [0]

Reverse transcriptase PCR is a means of amplifying RNA. The RNA is transcribed into complementary DNA (cDNA) using the enzyme reverse transcriptase, the cDNA is then amplified by conventional PCR.

19- The level of cellular telomerase activity will affect:

- 1) The rate of cell growth [0]
- 2) Cell death [0]
- 3) The number of cell divisions a cell is capable of undergoing [100]
- 4) Cell survival [0]
- 5) RNA synthesis [0]

The telomere is a DNA sequence at the end of each chromosome which becomes progressively shorter with each division the cell undergoes. When it is reduced to a critical length the cell is not capable of dividing, the enzyme telomerase is able to lengthen the telomere thus preventing this occurring.

Pathology

1- Progressive Massive Fibrosis (PMF) is most likely to be found in which of the following?

- 1) Complicated silicosis [100]
- 2) Extrinsic allergic alveolitis [0]
- 3) Lobar pneumonia [0]
- 4) Sarcoidosis [0]
- 5) Simple coal workers pneumoconiosis [0]

Progressive Massive Fibrosis is diagnosed by Chest X-Ray as round masses, several centimetres in diameter usually in the upper lobes. They may have necrotic centres. In silicosis a more accurate term is 'conglomerate nodules'.

2- Which of the following statements regarding jejunal biopsy is correct?

- 1) Electron microscopy is necessary to confirm the presence of villous atrophy [0]
- 2) Sub-total villous atrophy is diagnostic of gluten-sensitive enteropathy and is not found in other conditions [0]
- 3) It is contra-indicated over the age of 70 years [0]
- 4) In tropical countries apparently healthy people have a mucosal structure which would be regarded as abnormal in Europe [0]
- 5) It can be used to diagnose Whipple's disease [100]

a – the villus atrophy may be seen with a magnifying glass b – sub-total villus atrophy is seen in a number of conditions other than coeliac disease (i.e. Severe tropical sprue, cow's milk / soya sensitivity in children, gastroenteritis, Whipple's disease, hypogammaglobulinaemia, neomycin therapy, laxative abuse, Norwalk agent) c – There is a group of patients who present with coeliac disease in older age – sometimes in their 90s. They present with iron deficiency anaemia, osteoporosis or weight loss. d – They would not be 'healthy'.

3- Twenty of thirty patients in an adult ward develop colicky abdominal pain and diarrhoea without vomiting between 21:00 and 01:00 hrs. Meat stew was served for lunch at noon. Which of the following is the likely diagnosis?

- 1) Bacillus Cereus [0]
- 2) Clostridium perfringens [100]
- 3) Enterotoxigenic E.Coli [0]
- 4) Enterovirus [0]
- 5) Staphylococcus Aureus [0]

This food poisoning with no vomiting and an incubation period between 9-13 hrs incubation is typical of clostridium perfringens. The history is too long for a typical Staph Aureus infection (vomiting a typical feature, incubation period 1-6 hrs) and rather short of enterovirus (24 hrs). The predominant symptom of B.Cereus (inc period 1-5 hrs) is marked vomiting with diarrhoea occasionally seen. E.Coli infection has an incubation period of 12-24hrs and is also associated with marked vomiting. Supportive treatment is all that is generally required with symptoms resolving after 24 hrs.

4- A 15-year-old girl was seen by her family physician because of increasing lethargy. She had a recent history of the "flu". Biochemistry tests show that she has renal impairment.

serum sodium 140 mmol/L (137 - 144)
serum potassium 4.2 mmol/L (3.5 - 4.9)
serum urea 28 mmol/L (2.5 - 7.5)
serum creatinine 280 µmol/L (60 - 110)

Her condition does not improve after several weeks on corticosteroid therapy, so a renal biopsy is performed. The biopsy demonstrates the presence of segmental sclerosis of 3 of 10 glomeruli identified in the biopsy specimen. Immunofluorescence studies and electron microscopy do not reveal evidence for immune deposits. What is the most appropriate advice to give regarding her condition?

- 1) She has an underlying malignancy [0]
 - 2) She may require a renal transplant in 10 years [100]
 - 3) She will improve if she loses weight [0]
 - 4) She will likely develop a restrictive lung disease [0]
 - 5) She will probably improve with additional corticosteroid therapy [0]
-

The findings point to focal segmental glomerulosclerosis (FSGS), which leads to chronic renal failure in half of cases. The lack of resolution with corticosteroid therapy and the progression to chronic renal failure is what sets FSGS apart from minimal change disease.

5- A 74-year-old man presented with acute pain, pallor and absent pulses in his right leg. Investigations revealed an embolus in his femoral artery.

What is the most likely source of this embolus?

- 1) marantic endocarditis [0]
- 2) paradoxical emboli [0]
- 3) rheumatic endocardial vegetations [0]
- 4) right ventricular thrombi [0]
- 5) thrombi from an atheromatous aorta [100]

Ulceration of an atheromatous plaque of the abdominal aorta is the most common source of emboli in this situation. Right ventricular thrombi would embolise to the lung. The others are possible but less likely causes.

6- Which of the following is activated by Cholera toxin?

- 1) Adenylate cyclase [100]
- 2) Guanlylate cyclase [0]
- 3) Peroxisome proliferator receptor (PPAR) gamma [0]
- 4) Sodium/potassium ATPase [0]
- 5) The glucose-sodium transporter [0]

Cholera toxin activates adenylate cyclase with generation of cAMP.

7- A 49-year-old woman has been an inpatient for the past 10 days for treatment of a bronchopneumonia. She has developed the onset of chills, fever, and skin rash over the past two days. A peripheral blood film reveals eosinophilia. On urinalysis she has ++ proteinuria. There is no past history of renal disease. Her hemoglobin A1C is normal. These findings would most strongly suggest which of the following diagnoses

- 1) Acute serum sickness [0]
- 2) Acute tubular necrosis [0]
- 3) Drug-induced interstitial nephritis [100]
- 4) IgA nephropathy [0]
- 5) Post-streptococcal glomerulonephritis [0]

The findings are typical of a drug-induced acute interstitial nephritis. Post-streptococcal GN appears weeks after the acute infection. Berger's disease (IgA nephropathy) is characterized by hematuria and often follows a 'flu-like' illness. Eosinophilia is not typical for serum sickness.

8- Carcinoid tumors of the lung (bronchial adenomas) originate from which of the following cell types?

- 1) Ciliated cell [0]
- 2) Clara cell [0]
- 3) Kulchitsky (K) cell [100]
- 4) Mucus (goblet) cell [0]
- 5) Type 2 Alveolar cell [0]

9- Which of the following concerning *Corynebacterium diphtheriae* is correct?

- 1) Causes skin infection [100]
- 2) Infection is often complicated by myocardial fibrosis after recovery from severe infection [0]
- 3) Is most unlikely to cause infection in an individual with a positive Schick test [0]
- 4) Mitis strain is generally more virulent than the intermedius strain [0]
- 5) Toxin is better absorbed through the nasal than the pharyngeal mucosa [0]

Corynebacterium diphtheriae is a gram positive, non-spore forming, pleomorphic bacteria that is also a facultative anaerobe. *Corynebacterium diphtheriae* causes Diphtheria. Typically diphtheria attacks the respiratory system, but may also affect the skin, conjunctiva and external genitalia. Signs and symptoms include sore throat, fever, and swelling of lymph nodes in the neck and general malaise. As the disease progresses Diphtheria toxin is secreted. This destroys the membrane surface of the affected areas and replaces them with a grayish tough leathery "Pseudomembrane" made of dead tissue, leukocytes and bacteria. Toxin could also affect the heart, nerves and other organs in the body causing Heart failure, nerve damage or suffocation. Toxin can be neutralized by the immune serum produced by the host cells. Diphtheria is transmitted from person to person. Human beings are the main reservoir.

10- A 60-year-old man was diagnosed last year with adenocarcinoma of the lung, and a 4 cm mass lesion was treated with a right lower lobectomy. He now has an abdominal CT scan that reveals scattered hepatic mass lesions and hilar lymphadenopathy. For several weeks, he has had increasing malaise. A urinalysis reveals marked proteinuria, and a 24 hour urine protein collection is 2.7 g/24hr. His serum urea is 30 mmol/L (2.5 - 7.5) with creatinine of 450 μ mol/L (60 - 110). A renal biopsy is performed, and there is focal deposition of IgG and C3 with a granular pattern. He is most likely to have which of the following conditions?

- 1) Goodpasture's syndrome [0]
- 2) Membranous glomerulonephritis [100]
- 3) Minimal change glomerulonephritis [0]
- 4) Nodular glomerulosclerosis [0]
- 5) Rapidly progressive glomerulonephritis [0]

Most cases of membranous GN are idiopathic, but in some patients there is a history of an infection or a malignancy (usually lung) with antigenemia.

11- Most of the cells that fill the alveoli in desquamative interstitial pneumonitis (DIP) are which of the following?

- 1) Eosinophils [0]

- 2) Lymphocytes [0]
- 3) Macrophages [100]
- 4) Neutrophils [0]
- 5) Plasma cells [0]

12- Angina due to an imbalance between O₂ supply and demand without atherosclerosis would most likely be seen in which of the following circumstances?

- 1) aortic regurgitation [100]
- 2) cardiac tamponade [0]
- 3) pulmonary regurgitation [0]
- 4) right heart failure [0]
- 5) tricuspid regurgitation [0]

13- Which of the following statements concerning abnormalities of the haemoglobin molecule is true?

- 1) Alpha thalassaemia is due to a deficiency of beta-chain production [0]
- 2) HbS is caused by a single base mutation on the beta-chain [100]
- 3) genes for the alpha and beta chains are located on the same chromosome [0]
- 4) in thalassaemia persistence of HbF is an adverse prognostic sign [0]
- 5) oligoneucleotide probes may assist in the diagnosis of haemoglobinopathies [0]

Alpha Thalassaemia is due to abnormalities of the alpha chain. Persistence of HbF has survival advantages in severely affected subjects. C-alpha 16, beta 11. e-Hb electrophoresis(Dr Shu Ho)

14- Apoptosis is induced by:

- 1) Activation of caspases [100]
- 2) The MAP kinase pathway [0]
- 3) DNA synthesis [0]
- 4) Antibodies [0]
- 5) Necrosis [0]

A key event in the initiation of apoptosis is the activation of a cascade of cysteine-aspartate specific proteases known as caspases.

15- Concerning complete atrioventricular septal defects which of the following statements is true?

- 1) are seen frequently in patients with trisomy 21 [100]
- 2) frequently have aortic valve insufficiency [0]
- 3) have a normal mitral valve structure [0]
- 4) include a coronary sinus atrial septal defect [0]
- 5) include a perimembranous ventricular septal defect [0]

16- The morphological appearance of *Pneumocystis carinii* infection in the lung is best characterised as which one of the following?

- 1) A bronchopneumonia with abscess formation [0]
- 2) A haemorrhagic and necrotizing pneumonia [0]

- 3) An acute respiratory distress syndrome (ARDS) with widespread hyaline membrane formation [0]
- 4) An interstitial pneumonitis with foamy intra-alveolar exudate [100]
- 5) An organizing bronchopneumonia [0]

Pneumocystis carinii is a fungal organism. In PC pneumonia, the organism is confined to the alveolar space of the lung and produce debris and cysts in the alveolar space with interstitial infiltration of lymphocytes and plasma cells. As a result, it can cause profound disturbance of oxygen exchange and fatal hypoxaemia if left untreated.

Physiology

1- 1. Mast cells:

- 1) Do not contain heparin [0]
- 2) Degranulation releases lytic enzymes and inflammatory mediators from storage granules [100]
- 3) Are lipophilic cells involved in inflammatory and immune responses [0]
- 4) Cross-linkage of surface IgA molecules by antigen may cause an anaphylactic reaction [0]
- 5) Depletion of circulating mast cells can cause mastocytosis [0]

Mast cells are basophilic cells in the connective and subcutaneous tissues, which are involved in inflammatory and immune responses. They contain storage granules that contain lytic enzymes (e.g. tryptase) and inflammatory mediators, e.g. histamine, heparin, 5-HT, leukotrienes, platelet aggregating factor, leucocyte chemotactic factor and hyaluronidase. Release of these mediators occurs during mast cell degranulation, which can be triggered by: tissue injury, drugs, complement activation, and foreign antigenic material. An anaphylactic reaction occurs when a previously sensitised individual is re-exposed to the antigen. It is an IgE mediated immune response. Mastocytosis occurs when excess mast cells are present in the circulation or as tissue infiltrates.

2- In porphyria, which of the following is least likely to precipitate an acute attack:

- 1) Menstruation [0]
- 2) Aspirin [100]
- 3) Phenytoin [0]
- 4) Thiopentone [0]
- 5) Starvation [0]

Porphyria is a group of diseases characterised by excess production and excretion of porphyrins and their precursors. They are caused by enzyme defects within the haem metabolic pathway. Stress, infection, pregnancy, menstruation, starvation and certain drugs may precipitate acute attacks. Definite precipitants include sulphonamides, barbiturates and phenytoin.

Drugs unsafe in porphyria - BNF

3- Which ONE of the following have their own self replicating DNA?

- 1) Golgi body [0]

- 2) Lysosomes [0]
- 3) mitochondria [100]
- 4) Peroxisome [0]
- 5) Rough Endoplasmic Reticulum [0]

Abnormalities of Mitochondrial DNA are associated with inherited conditions such as Leber's OA, MELAS syndrome and DIDMOAD(Dr Vajira H. W. Dissanayake)

4- In sickle cell disease:

- 1) The Sickledex test involves adding a reagent to blood, which allows the nature of the haemoglobinopathy to be determined [0]
- 2) It is caused by the substitution of glutamic acid by valine at position 4 on the beta chain of haemoglobin [0]
- 3) The erythrocytes of Haemoglobin AS patients can sickle at a PO₂ of 5 to 6 kPa (40 ? 50 mmHg) [0]
- 4) The erythrocytes of Haemoglobin SC patients may sickle at a PO₂ of 4 kPa (30 mmHg) [100]
- 5) Exchange transfusions prior to major surgery on HbSS patients, aims to lower the HbS concentration to 60% [0]

Sickle cell disease is a haemoglobinopathy caused by the substitution of glutamic acid by valine at position 6 (from the N-terminal) of the beta chain. Inherited as an autosomal gene, heterozygous (HbAS) and homozygous (HbSS) forms exist. A low partial pressure of oxygen (PO₂) causes HbS to polymerise and precipitate, resulting in sickling of the erythrocyte. HbSS patients sickle at PO₂ of 5 ? 6 kPa and HbAS patients sickle at PO₂ of 2.5 ? 4 kPa. A mild disease is produced when heterozygotes for HbS combine with other haemoglobins e.g. Haemoglobin C, thus creating HbSC. Sickling occurs at around 4 kPa. Diagnosis of sickle cell disease requires the detection of HbS. The Sickledex test involves the addition of reagent to blood; turbidity confirming the presence of HbS, but it gives no information on other haemoglobins. Haemoglobin electrophoresis is the only investigation that determines the nature of the haemoglobinopathy.

5- Which of the following concerning renal blood flow is true?

- 1) is 40% of the cardiac output at rest [0]
- 2) can be measured using the Fick principle [100]
- 3) is higher in the medulla than the cortex [0]
- 4) is increased when renal nerves are stimulated [0]
- 5) is decreased in response to hypoxia [0]

Renal blood flow is approximately 25% of cardiac output. The 'Fick principle' can be used to estimate RBF through clearance. RBF is higher in the cortex than medulla as one might expect with the increasing glomeruli in this region. Sympathetic stimuli produce vasoconstriction and RBF should be increased in response to hypoxia.

6- In a normal heart, the oxygen saturation of a sample of blood taken from a catheter in the pulmonary capillary wedge position should be equal to a sample from which of the following?

- 1) coronary sinus [0]
- 2) femoral artery [100]
- 3) pulmonary artery [0]
- 4) right atrium [0]
- 5) right ventricle [0]

Pulmonary capillary wedge normal values reflect pressures and saturations of the left side of the heart. Consequently wedge pressures are between 6-12 mmHg and the saturations of blood taken from the wedged source reflects blood in the pulmonary vein and hence high sats similar to that seen in the femoral artery.

7- The action of noradrenaline released at sympathetic nerve endings is terminated by

- 1) enzymatic decarboxylation [0]
- 2) enzymatic inactivation by catechol-O-methyl transferase [0]
- 3) re-uptake of noradrenaline by the axonal terminals [100]
- 4) oxidative deamination by monoamine oxidase [0]
- 5) Removal by the circulating blood [0]

A popular question for the exam but simple physiology gets the right answer here. The effects of neurotransmitter release are principally terminated by neuronal uptake. Intraneuronal NA is usually taken back up into the neurosecretory granules and a small amount is metabolised by MAO. Even smaller quantities that escape into the circulation are metabolised by COMT.

8- In sickle cell disease:

- 1) The Sickledex test involves adding a reagent to blood, which allows the nature of the haemoglobinopathy to be determined [0]
- 2) It is caused by the substitution of glutamic acid by valine at position 4 on the beta chain of haemoglobin [0]
- 3) The erythrocytes of Haemoglobin AS patients can sickle at a PO₂ of 5 to 6 kPa (40 - 50 mmHg) [0]
- 4) The erythrocytes of Haemoglobin SC patients may sickle at a PO₂ of 4 kPa (30 mmHg) [100]
- 5) Exchange transfusions prior to major surgery on HbSS patients, aims to lower the HbS concentration to 60% [0]

Sickle cell disease is a haemoglobinopathy caused by the substitution of glutamic acid by valine at position 6 (from the N-terminal) of the beta chain. Inherited as an autosomal gene, heterozygous (HbAS) and homozygous (HbSS) forms exist. A low partial pressure of oxygen (PO₂) causes HbS to polymerise and precipitate, resulting in sickling of the erythrocyte. HbSS patients sickle at PO₂ of 5 - 6 kPa and HbAS patients sickle at PO₂ of 2.5 - 4 kPa. A mild disease is produced when heterozygotes for HbS combine with other haemoglobins e.g. Haemoglobin C, thus creating HbSC. Sickling occurs at around 4 kPa. Diagnosis of sickle cell disease requires the detection of HbS. The Sickledex test involves the addition of reagent to blood; turbidity

confirming the presence of HbS, but it gives no information on other haemoglobins. Haemoglobin electrophoresis is the only investigation that determines the nature of the haemoglobinopathy.

9- The pulmonary vascular system is different from the systemic circulation in that the pulmonary system demonstrates which of the following?

- 1) High pressures, high flow rates, highly compliant vessels [0]
- 2) High pressures, high flow rates, low compliance vessels [0]
- 3) Low pressures, high flow rates, high compliance vessels [0]
- 4) Low pressures, low flow rates, high compliance vessels [100]
- 5) Low pressures, low flow rates, low compliance vessels [0]

10 -Which ONE of the following is true concerning Antidiuretic hormone (ADH)?

- 1) Carbamazepine potentiates it's release [100]
- 2) Ethanol potentiates it's release [0]
- 3) It circulates in the blood bound to neurohypophysin [0]
- 4) It is a cyclic octapeptide [0]
- 5) It is synthesised in the posterior pituitary [0]

ADH is a nonapeptide manufactured in the paraventricular and supra-optic nuclei of the hypothalamus and released from the posterior pituitary. It acts on the collecting ducts improving water permeability and hence water retention. Carbamazepine as well as other agents such as thiazides and SSRIs may potentiate its release. Ethanol usually inhibits release.

11- Which of the following is found in subjects acclimatised to life at high altitudes ?

- 1) Increased mean corpuscular haemoglobin concentration [0]
- 2) Increased pulmonary artery pressure [100]
- 3) Periodic respiration [0]
- 4) Reduced cardiac output [0]
- 5) Reduced airway resistance [0]

discriminating question! Acclimatisation results in increased Hb with erythrocytosis. Periodic respiration is a feature of non-acclimatisation. Respiration is normal when subjects are acclimatised to altitude as is cardiac output. Pulmonary artery pressure increases in an effort to oxygenate more blood. 2,3-DPG increases.

Here's a good read from Trek Nepal.

<http://www.project-himalaya.com/infohealth-AMS.html>

12- You are asked to see a patient in the Intensive Care Unit who is short of breath and tachycardic to rule out a cardiac cause of her symptoms. A right heart catheter reveals that the mixed venous O₂ saturation is 70%; the pulmonary capillary wedge O₂ saturation is 97%. The haemoglobin is normal and the patient is afebrile. You are able to state which of the following?

- 1) her cardiac output is decreased [0]
- 2) her cardiac output is normal [100]
- 3) her heart is normal [0]
- 4) she has high-output failure [0]

5) she is in shock due to a non-cardiac cause [0]

Statistics

1- A randomised double-blind placebo controlled study of a cholesterol-lowering drug in the primary prevention of coronary heart disease was conducted over a five-year follow up period. The absolute risk of myocardial infarction in the group-receiving placebo during this time was 10 per cent.

The relative risk of those given the cholesterol lowering medication was 0.8.

What number of patients will need to be treated with active drug for five years to prevent one myocardial infarction?

- 1) 20 [0]
- 2) 40 [0]
- 3) 50 [100]
- 4) 80 [0]
- 5) 100 [0]

The absolute risk of MI in the treatment group is $10\% \times 0.8 = 8\%$ (as they have a relative risk of 0.8 as compared to the placebo group). $NNT = 1 / \text{absolute relative risk}$. ARR is the risk in treated group - risk in control group. Therefore the ARR is $10\% - 8\%$ and the NNT for that period is $1/0.02 = 50$.

2- Regarding standard error of the mean (SEM) and standard deviation (SD) the following ONE statement is true

- 1) Standard error of mean is calculated by taking the square root of the standard deviation of the sample means [0]
- 2) Standard deviation invariably falls with increasing sample size [0]
- 3) Standard error of mean increases with sample size [0]
- 4) if standard deviation is greater than the mean the distribution is negatively skewed [100]
- 5) Student's t test is a non-parametric test [0]

The Standard error of the Mean = $SD/\text{sq root } n$. SD does not necessarily fall with sample size as the distribution of values may increase and hence SD increase. SEM would decrease with sample size as can be seen in the above calculation. d - negatively distributed. Student's T test is a parametric test comparing normally distributed data.

3- A publication describes a new diagnostic test for myocardial infarction. You want to know what proportion of patients with a confirmed myocardial infarction will be identified by the test.

Which one of the following measurements would indicate this?

- 1) Accuracy [0]
- 2) Negative predictive value [0]
- 3) Positive predictive value [0]

4) Sensitivity [100]

5) Specificity [0]

The specificity of a test is the probability that a test will produce a true negative result when used on an unaffected population, whereas the sensitivity of a test is the probability that it will produce a true positive result when used on an affected population (as determined by a reference or "gold standard"). The positive predictive value of a test is the probability that a person is affected when a positive test result is observed. The negative predictive value of a test is the probability that a person is not affected when a negative test result is observed. Accuracy is expressed through the above four parameters.

More information on statistics

STATISTICS (sensitivity, specificity, PPV, NPV, Accuracy)

DISEASE NO DISEASE TEST A B POSITIVE true + false +

TEST C D NEGATIVE false - true -

SENSITIVITY ($= a/a+c$): The proportion of patients with the disease being tested for who have a positive test.

SPECIFICITY ($= d/b+d$): The proportion of patients without the disease being tested for who have a negative test.

POSITIVE PREDICTIVE VALUE ($= a/a+b$): The proportion of patients with a positive test who have the disease being tested for.

NEGATIVE PREDICTIVE VALUE ($= d/c+d$): The proportion of patients with a negative test who do not have the disease being tested for.

The PPV increases with a high prevalence but the NPV falls

ACCURACY (%) = Sensitivity + Specificity - 100

NORMAL DISTRIBUTION: 68% of values are within 1 SD of the mean, 95% are within 2SD, 99.7% are within 3SD. 95% reference interval = mean \pm 2SD

STANDARD ERROR OF THE MEAN (SE) = standard deviation of the sampling distribution = SD/ $\sqrt{\text{sample size}}$. (a measure of how far the sample mean is likely to be from the population mean) 95% confidence interval for mean = mean \pm 2SE (there is a 95% chance that this interval contains the true mean).

DETECTING A DIFFERENCE BETWEEN GROUPS: Null hypothesis = the hypothesis that there is no difference between the groups. Type I error = claiming there is a true difference when there isn't (a P-value < 0.05 means that the chance of a type 1 error is $< 5\%$ and that the difference is statistically significant, the smaller the P-value the less the chance of a type 1 error). Type II error = claiming there is no difference when in fact there is.

RELATIVE RISK (RR) AND RELATIVE RISK

REDUCTION (RRR): $RRR = \frac{\text{Control event rate (CER)} - \text{experimental event rate (EER)}}{\text{Control event rate (CER)}}$

$RR = \frac{EER}{CER}$

Absolute risk reduction (ARR) = CER - EER

Number needed to treat to save one adverse event (NNT) = $1/ARR$

4- In a trial of a new drug the following results were obtained:

	improved	not improved
treatment group	44	16
placebo group	36	26

Which of the following statements regarding the statistical analysis or interpretation of the trial is true?

- 1) A Student t-test could be used. [0]
- 2) Pearson's coefficient of linear regression would be an appropriate significance test. [0]
- 3) The data could be evaluated using the Chi-squared test. [100]
- 4) The numbers are too small to draw any conclusions. [0]
- 5) The results so obviously show the benefit of treatment that statistical analysis is not required. [0]

This data would be ideal for a Chi-squared test. It is a 2 x 2 contingency table for which there is a special Chi-squared formula that gives a value that can be looked up in a table giving the p value.

Nothing is ever so obvious that no statistical analysis is needed surely? Pearson's coefficient cannot be calculated as there is no linear regression to plot. The Student t-test cannot be used as we are comparing proportions not means.

<http://www.roads.dft.gov.uk/roadsafety/goodpractice/41.htm>

5- A new antihypertensive drug needs to be investigated to establish its relative potency.

Which of the following techniques is most appropriate for this purpose?

- 1) bioassay [100]
- 2) case-control study [0]
- 3) double-blind, randomized, placebo controlled study [0]
- 4) postmarketing surveillance [0]
- 5) sequential trial [0]

Biological assays are designed to measure the relative potency of different preparations. Blood pressure is highly variable and is subject to variability because of the patient's level of anxiety and the method used by the observer to measure it. In a

test of EFFICACY of an antihypertensive drug, a double-blind, randomized design would be favourable. A sequential trial (a trial in which the data are analysed after each participant's results become available, and the trial continues until a clear benefit is seen in one of the comparison groups) could also be used to assess efficacy, but there would have to be a large expected difference from placebo.

6- In a trial of a new drug, 13/28 treated improved over a one month period, compared with 3/28 on placebo. For Chi2 testing which of the following is correct?

- 1) The figures should first be converted to percentages. [0]
- 2) The results would almost certainly suggest that more cases were needed to obtain a significant result. [0]
- 3) There is one degree of freedom. [100]
- 4) A value of Chi2 of 4.6 would imply that the result would have been obtained by chance in 46/100 trials. [0]
- 5) The results would be invalidated if a disproportionate number of cases treated with the new drug had developed side effects. [0]

Chi2 testing refers to count data (categorical). It therefore refers to 2 by 2 tables or larger. The test statistic is defined by:

$$\text{Chi2} = \sum \frac{(\text{observed} - \text{expected})^2}{\text{expected}}$$

The degrees of freedom equal the number of cells minus 1 (if you have 4 dinner guests and 3 have chosen where to sit, the last person has no freedom to choose where to sit). Significance can be looked up using the Chi2 distribution according to the appropriate number of degrees of freedom.

7- Adequate randomisation can be assumed in which of the following circumstances?

- 1) All consecutive patients attending a tertiary referral centre. [0]
- 2) A sample using healthy volunteers. [0]
- 3) A sample of those judged to be appropriate for inclusion in the study. [0]
- 4) A sample based on a family cluster. [0]
- 5) A stratified random sample. [100]

The actual patients included in the study often differ substantially from what was initially intended. This dramatically alters one's interpretation of a study. The target population includes all those with a given disease, and is seldom fully accessible. The accessible population available for study may be biased in time or place. It is important to randomise when selecting a sample which are supposed to represent the target population. In simple randomisation, every member of the population is numbered, and a random sample is selected. In a stratified random sample, groups of interest are identified, and then randomisation occurs within those groups. In systematic sampling a "periodic" approach is used. This is not really random and is open to alteration and bias. In a cluster sample, a natural grouping of population is used (such as a family), but this may well be unrepresentative of the whole population. Classic errors in randomisation are:

Consecutive sampling, which may well not be representative if the study time is short. Convenience sampling: strong potential for bias, with volunteers generally healthier than others.

Judgmental sample: including those that you want only. The potential for systematic error is enormous.

8- An experienced group of surgeons report on a randomised placebo-controlled trial comparing a particular carotid surgery technique as compared to a sham operation. Their study concludes that 'using this advanced surgical technique reduces the risk of stroke from 4.3% to 3.8% ($p < 0.05$)'.

What has this study proved about the surgical procedure?

- 1) Acceptability [0]
- 2) Effectiveness [0]
- 3) Efficacy [100]
- 4) Safety [0]
- 5) Usefulness [0]

This is an experienced group of vascular surgeons working in ideal conditions. Similar studies have been reported for carotid surgery but it has been difficult to prove their usefulness outside areas of expertise. It is often difficult to generalise the findings in a study group to everyday practice. Efficacy = the effect of something under ideal or laboratory conditions, Effectiveness = the effect of something in the real world.

9- A randomised double-blind placebo controlled study of a cholesterol-lowering drug for the primary prevention of coronary heart disease was conducted. It had a five-year follow up period.

The results showed an absolute risk of myocardial infarction in the group-receiving placebo during was 10 per cent. The relative risk of those given the cholesterol lowering medication was 0.8

What number of patients will need to be treated with the drug for five years to prevent one myocardial infarction?

- 1) 20 [0]
- 2) 40 [0]
- 3) 50 [100]
- 4) 80 [0]
- 5) 100 [0]

This is a question concerning Number Needed to Treat (NNT). The calculation involves a little arithmetic. The absolute risk of MI is 10%. The relative risk in the treated group is 0.8. We need the absolute risk in the treated group which is $0.8 \times 10\% = 8\%$. The difference between the two is the 'absolute risk reduction' which should always be the preferred headline figure for presenting results. In this case it is 2%. To get the number needed to treat to prevent MI we simply divide this into 100 which gives us 50. We need to treat 50 patients with the drug to prevent 1 MI.

10 -Which of the following statements is true regarding statistical interpretation of data?

- 1) The incidence equals the number of newly affected individuals divided by the number of people at risk for the disease for a given duration. [100]
- 2) The prevalence is readily distinguished from the incidence in relation to cancers. [0]
- 3) The mortality rate is a kind of cumulative prevalence rate. [0]
- 4) The cumulative incidence rate is usually given over a 10 year period. [0]
- 5) The prevalence rate is defined as the total number of cases divided by the total number in the population. [0]

The incidence can be thought of as the number of new cases occurring in a given time. The cumulative incidence rate is usually reported over a year. Prevalence equals the total number of cases divided by the total number of at risk. In diseases for which the exact onset cannot be determined such as cancers, it may be difficult to distinguish between incidence and prevalence. Mortality rate is a special kind of cumulative incidence rate, with deaths in the numerator and population in the denominator. Case fatality rate, has deaths in the numerator and the number of people with a specific disease in the denominator.

11- A new diagnostic test for malabsorption has been analysed and the results have yielded the following 2x2 contingency table.

test result	Disease present	
	yes	no
+ve	0.9	0.1
-ve	0.2	0.8

Applying this test to a case of chronic diarrhoea from a patient group where the prevalence of malabsorption is known to be 20% (probability = 0.2) what is the probability of a patient having malabsorption if they have a positive test?

- 1) 0.16 [0]
- 2) 0.24 [0]
- 3) 0.48 [0]
- 4) 0.64 [100]
- 5) 0.8 [0]

This is tough but the College are putting more and more Evidence Based Medicine Questions into the exam. This question tests understanding of pre-test and post-test odds, likelihood ratios, sensitivity and specificity. The calculation is as follows.

$$\text{Sensitivity} = 0.9 / (0.9 + 0.2) = 0.818$$

$$\text{Specificity} = 0.8 / (0.1 + 0.8) = 0.889$$

$$\text{Likelihood ratio for a positive test (LR+)} = 0.818 / (1 - 0.889) = 7.2$$

$$\text{Pre-test odds} = 0.2 / (1 - 0.2) = 0.25$$

Post-test odds = pre-test odds X LR+ = 0.25 X 7.2 = 1.8

Post-test probability = 1.8 / (1.8 + 1) = 0.64

	Disease present	
test result	yes	no
+ve	true positive (A)	false positive (B)
-ve	false negative (C)	true negative (D)

Sensitivity (how much a test is positive in disease) = $A / (A + C)$

Specificity (how much a test is negative in health) = $D / (B + D)$

Positive Predictive Value = $A / (A + B)$

Negative Predictive value = $D / (C + D)$

Pre-test odds = the odds of having the disease before you do the test (e.g. your rule-of-thumb guestimate or the prevalence of the disease in the population or based on clinical findings etc.)

Post-test odds = the odds of having the disease after you did the test

Systematic Error = $(A + B) / (A + C)$ = good statistic for - 1) breaking the ice at a party of epidemiologists, 2) confusing your fellow SpRs at meetings

Likelihood Ratio (LR) + (the ratio of the chance of having a +ve test if the disease is present to the chance of having a positive test if the disease is absent) = sensitivity / (1 - specificity)

LR- = $(1 - \text{sensitivity}) / \text{specificity}$

WHAT? ... Aghh! I knew I hated stats. Of what use is an LR?

Likelihood Ratios are good for

directly calculating post-test odds

tests with multiple levels (i.e. not just +ve or -ve). Calculate the LR at each level by taking the ratio of true +ves to false +ves both expressed as percentages of the total number tested.

diseases requiring multiple tests. The post-test odds after one test is the pre-test odds for the next.

bluffing your way in statistics, especially when talking to Evidence Based Medicine boffins

12- Which of the following is true regarding sensory neural hearing loss?

1) The incidence is twice as high in babies admitted to neonatal intensive care units compared with the normal population. [0]

2) The risk is increased in children who have had rubella. [0]

3) Approximately 1 per 1000 children will have greater than 40db hearing loss. [100]

4) The risk is increased in Noonan's Syndrome. [0]

5) The risk is increased in Down's Syndrome. [0]

Sensory neural hearing loss is caused by lesions in the cochlea or the auditory nerve or central connections. It may be unilateral or bilateral. Language acquisition and secondary educational difficulties follow, with social isolation, and an increased risk

of mental health problems. The approximate incidence is 1 per 1000 children. Risk factors include:

NICU admission: low birth weight, less than 32 weeks gestation, prolonged ventilation, prolonged jaundice, ototoxic drugs, hypoxic ischaemic encephalopathy, neonatal meningitis.

Congenital infection (rubella, CMV).

Dysmorphic syndromes (affecting head and neck).

Family history of a close relative needing a hearing aid below the age of 5 years.

Infections: acute bacterial or TB meningitis, mumps (latter usually unilateral).

If all risk factors are considered, only around 50% of cases could be identified by testing between 5 and 10% of all babies. Conductive hearing loss is related to middle ear pathology. This is commoner in Down's Syndrome, cleft palate, Turner's Syndrome, and facial malformation syndromes.

13- A study of a new chemotherapy drug for lung cancer is reported in a medical journal. The authors state that with the new agent the 5-year mortality rate was 60%. Without treatment the 5-year mortality rate was 80%.

Which of the following represents the Absolute Risk Reduction using this treatment?

- 1) 10% [0]
- 2) 20% [100]
- 3) 25% [0]
- 4) 33% [0]
- 5) 40% [0]

The absolute risk reduction is an important figure and should always be quoted instead of the the relative risk reduction.

Examples. If a drug reduces the incidence of heart attacks from 10% to 5% then ...

the control event rate (CER) is 10%

the experimental event rate (EER) is 5%

the relative risk reduction (RRR) is 50%

the absolute risk reduction (ARR) is 5%

the number needed to treat (NNT) is $100\% / 5\% = 20$

14- In significance testing which of these statements is correct?

- 1) A Type I error is to reject the alternative hypothesis when it should be accepted. [0]
- 2) A Type II error is to accept the alternative hypothesis when it should be rejected. [0]
- 3) The probability associated with a Type I error is the significance level. [100]
- 4) The significance level is determined at the end of a significance test. [0]
- 5) The significance level is always set to 5%. [0]

The null hypothesis is that there is no differences between two groups. The alternative hypothesis is that there is a difference. Rejecting the null hypothesis when there really is no difference between the two groups is a Type 1 error. Accepting the null

hypothesis (rejecting the alternative hypothesis) when there is a difference is a type 2 error. Rejection of the null hypothesis depends on the probability - significance level which is usually (but not always) at $p < 0.05$.

15- There is presently no known effective treatment for a chronic disease. A new treatment is known to be effective in animal models and shows promise in short-term studies in patients. There are some theoretical concerns regarding possible hepato- and bone marrow toxicity although thus far, no toxicity has been observed in studies.

What is the most appropriate next step in the drug's development?

- 1) A case control study [100]
- 2) No further studies should be done and drug development should be stopped [0]
- 3) An open study [0]
- 4) A randomised double blind placebo controlled study [0]
- 5) A randomised single blind placebo controlled study [0]

A case control study is efficient (high yield of information from relatively few subjects) and provides an estimate of strength of association (odds ratio) between the use of drug and development of side-effects for liver and bone marrow. This may form the Phase 1 and 2 trials involving relatively few subjects to establish therapeutic efficacy and acceptable safety before large scale clinical trials involving placebo controlled trials (phase 3) are carried out to confirm therapeutic efficacy and acceptable safety.

16- A study of the intellectually handicapped was performed. The 112 subjects, put through program A, showed an increase in their mean IQ score of 6 points. The 115 subjects, put through program B, showed an increase in their mean IQ score of 4. The p value was >0.05 . Which of the following is true:

- 1) the numbers are too large for a Student t-test [0]
- 2) the study demonstrates the usefulness of program A [0]
- 3) the distribution of individual values is not important [0]
- 4) even though the difference between the means is not significant it would be appropriate to calculate confidence intervals [100]
- 5) the above results would be found by chance in less than 1:20 [0]

a-The t-test could be used in the comparison of data and the larger the sample size the more meaningful the data. b-A is no more useful than B or even simply repeating an IQ test? c+d This gives us an idea of the distribution of the data. Confidence intervals may provide more meaningful data concerning the study. e-The chances are less than 1 in 20 as P is greater than 0.05.

17- A study of an established antihypertensive agent against placebo reports that the risk of death due to cardiac causes is lower on treatment. It gives 5-year mortality due to cardiac causes as 12% on placebo and 8% on treatment. The authors conclude that 'a 33% reduction in cardiac deaths is seen with treatment'.

The figure '33%' represents which of the following?

- 1) Absolute Risk Reduction [0]
- 2) Control Event Rate [0]
- 3) Experimental Event Rate [0]

- 4) Number Needed to Treat [0]
5) Relative Risk Reduction [100]

An understanding of quantities discussed in 'Evidence-based medicine' is becoming increasingly important for the exam. If a drug reduces the incidence of heart attacks from 10% to 5% then ...

the control event rate (CER) is 10%
the experimental event rate (EER) is 5%
the relative risk reduction (RRR) is 50%
the absolute risk reduction (ARR) is 5%
the number needed to treat (NNT) is $100\% / 5\% = 20$

18 -A new antiplatelet agent has been proven to reduce the risk of stroke in a year from 10% in patients treated with conventional treatment to 6% in patients treated with conventional treatment plus the new agent. The cost of this new drug is £100 per month.

How much would a hospital need to spend to prevent one stroke.

- 1) £1200 [0]
2) £6000 [0]
3) £18000 [0]
4) £30000 [100]
5) £100000 [0]

The 'Absolute Risk Reduction' is $10\% - 6\% = 4\%$. The 'Number Needed to Treat' to prevent a stroke therefore equals $100 / 4 = 25$. 25 patients would need to be treated at a cost of £100/month for 12 months to prevent a stroke which gives the total cost as £30000.

19- A randomised, double-blind, placebo controlled trial of a cholesterol lowering drug in the primary prevention of coronary heart disease is reported.

1000 subjects are treated with the active drug, and 1000 are given placebo. They are followed up over a five year period and 100 individuals in the placebo group and 80 in the treatment group suffer a myocardial infarction.

What is the annual percentage risk of myocardial infarction in the group treated with placebo?

- 1) 0.5% [0]
2) 2% [100]
3) 5% [0]
4) 8% [0]
5) 10% [0]

Why this question is in the MRCP exam is anyone's guess! This is more of a mathematics exam.

In the 5 years 100 patients in the placebo group develop an MI. Assuming this is spread evenly across the years this means that 20 patients (out of 1000) suffer an MI

each year. The annual risk is therefore $20/1000 = 0.02$ which, expressed as a percentage is 2.

20 -A letter published in a medical journal suggests that an established antidepressant may cause photosensitivity. The manufacturer wishes to set up a study to determine rapidly and efficiently whether this is a true association.

Which one of the following techniques is most appropriate?

- 1) case control study [100]
- 2) dose ranging study [0]
- 3) double blind, randomized, placebo controlled study [0]
- 4) meta-analysis [0]
- 5) sequential trial [0]

The drug is an established one and the correct answer can be found by elimination. A "double-blind, randomized, placebo controlled study" would be time consuming, expensive and unlikely to be powered enough to detect what may be a rare toxic effect. Remember the drug is established so there have been many patients taking it already and only lately a letter is published in a medical journal. A "meta-analysis" would look at combining previous randomized controlled trials and there would have at least been some of the trials that looked at photosensitivity for it to be of any use in this case; it therefore seems to be excluded by simple logic. A "dose ranging study" is really for another purpose - to decide the correct dose in early clinical trials so is hardly going to be of any use here. A "sequential" trial would be comparing one therapy to another sequentially (usually with wash out periods in between). Again there are unlikely to be enough subjects in the trial for this small risk. This leaves the "case control study" which seems the logical choice. This would look at cases of photosensitivity (perhaps in subjects taking any antidepressant medication) and compare them to age matched (or other criteria matched) control subjects to see if they were more / less / equally likely to be on the antidepressant in question. This is by far the most rapid (since adverse drug reactions will have already been collected) and efficient means of answering the question.

21- Statistical independence may be assumed in which of the following circumstances?

- 1) Successive measures taken on the same individual. [0]
- 2) Stratified sampling from a target population. [100]
- 3) Two matched individuals in a case control study. [0]
- 4) Response to antibiotics of children with otitis media who have a CRP of above 100. [0]
- 5) Diagnosis of pyloric stenosis by ultrasound scan in patients attending a tertiary referral centre. [0]

Independent events do not affect each other. Thus, the chance of event A occurring is completely unaffected by the chance of B occurring. Two measures on the same individual are clearly dependent, but the same also applies to 2 matched individuals such as in a case control study. The outcome of patients attending a tertiary referral centre is bound to depend on the patients referred, and the facilities and expertise

available at that centre. In patients with elevated CRP, one might suspect that there is a higher risk of bacterial otitis media, and, therefore, one might expect a greater response to antibiotics. The response to antibiotics is, therefore, dependent to some extent on the raised CRP.

22- A study has been designed to investigate whether a certain drug plus physiotherapy treatment is better than drug treatment alone in the management of rheumatoid arthritis. After randomizing the patients a small proportion of the drug plus physiotherapy group decide to drop out of the study or omit some treatment sessions specified in the research protocol. What is the correct way of analysing the subsequent data?

- 1) Assume the patients have withdrawn their consent [0]
- 2) Exclude these patients from all analysis [0]
- 3) Extend the trial recruitment to make up the numbers [0]
- 4) Include these patient outcomes in the drug plus physiotherapy group [100]
- 5) Interview the patients and report their group separately [0]

This is the principle of 'intention to treat'. It is possible that the physiotherapy intervention was harmful to the patients and this is why they left. Intention to treat helps to reduce bias by sticking to the original allocation of treatment and analyzing the patient in that treatment group even (and concentrate for this bit) even if they don't get it!

23- In a chronic disease which has no known effective treatment, a new treatment is known to be effective in animal models and shows promise in short-term studies in patients.

There are some theoretical concerns about toxicity involving liver and bone marrow although no cases have been observed in studies so far.

What is the most appropriate next step in the drug's development?

- 1) case control study [0]
- 2) No further studies should be done and drug development should be stopped [0]
- 3) open study [100]
- 4) randomised double blind placebo controlled study [0]
- 5) randomised single blind placebo controlled study [0]

The story that is described is of an early drug development that has gone through phase I trials. The next logical step is to study the risks, potential benefits and monitoring procedures with a phase II trial. The only option that fits this is the 'open study'. The randomised controlled trials would test a new drugs efficacy against an established treatment. A case-control study would be useful for an already established drug and 'no further studies' seems a little too pessimistic!

Surgery

1- Which of the following is true regarding diabetic foot ulceration?

- 1) Autonomic neuropathy results in increased resting blood flow [0]
- 2) Callus formation at pressure areas is an important predictor of ulceration [100]
- 3) Plantar ulceration is most commonly due to atherosclerosis. [0]
- 4) Skin infection is the most common initiating event in ulceration. [0]

5) Radiography can readily distinguish between Charcot's joint and osteomyelitis. [0]

Callus formation at pressure areas is an important predictor of potential ulceration. Plantar ulceration is usually a consequence of neuropathy and minor skin trauma is probably the most common initiating event. Blood flow is often decreased with autonomic neuropathy hence sympathectomy may be performed to improve skin blood flow. It is difficult to radiographically distinguish between Charcot's joint and osteomyelitis.

2-Which of the following statements regarding jejunal biopsy is correct?

- 1) Electron microscopy is necessary to confirm the presence of villous atrophy [0]
- 2) Sub-total villous atrophy is diagnostic of gluten-sensitive enteropathy and is not found in other conditions [0]
- 3) It is contra-indicated over the age of 70 years [0]
- 4) In tropical countries apparently healthy people have a mucosal structure which would be regarded as abnormal in Europe [0]
- 5) It can be used to diagnose Whipple's disease [100]

a – the villus atrophy may be seen with a magnifying glass b – sub-total villus atrophy is seen in a number of conditions other than coeliac disease (i.e. Severe tropical sprue, cow's milk / soya sensitivity in children, gastroenteritis, Whipple's disease, hypogammaglobulinaemia, neomycin therapy, laxative abuse, Norwalk agent) c – There is a group of patients who present with coeliac disease in older age – sometimes in their 90s. They present with iron deficiency anaemia, osteoporosis or weight loss. d – They would not be 'healthy'.

3- Osteomalacia may be expected in

- 1) Sarcoidosis [0]
- 2) Auto-immune adrenalitis [0]
- 3) Pseudo-hypoparathyroidism [0]
- 4) Pernicious anaemia [0]
- 5) Mercury poisoning [100]

Osteomalacia may occur with vitamin D deficiency. Mercury poisoning or any heavy metal poisoning causes an acquired Fanconi syndrome with distal renal tubular acidosis.

4- A 24-year-old woman develops infective endocarditis involving the aortic valve. She receives a porcine bioprosthesis because of her desire to have children and not to take anticoagulant medication. After ten years, she must have this prosthetic valve replaced. Which of the following pathologic findings in the bioprosthesis has most likely led to the need for replacement?

- 1) Calcification with stenosis [100]
- 2) Dehiscence [0]
- 3) Infective endocarditis [0]
- 4) Strut failure [0]
- 5) Thrombosis [0]

The bioprosthesis has the advantage of not requiring anticoagulation, but it does not wear well with time, and typically must be replaced within 5 to 10 years.

5- A 34 year old male presents with back-pain and weakness. Which of the following would support a diagnosis of prolapsed intervertebral disc?

- 1) bilateral symmetrical nerve involvement [0]
- 2) Loss of sensation over the left outer upper thigh [100]
- 3) no evidence of nerve compression [0]
- 4) pain which is worse on resting [0]
- 5) pain which is unremitting in character [0]

Prolapsed intervertebral disc is associated with pain and neurological loss in one nerve root. Frequently roots of the sciatic nerve are affected. Compression of more than one root suggests an alternative diagnosis. Pain at rest would suggest an alternative diagnosis such as infection, tumour or metabolic disease as would unremitting pain.

6- A 30-year-old woman has a right mastectomy and axillary lymph node dissection for a carcinoma diagnosed by fine needle aspiration cytology. The histologic pattern is that of a poorly differentiated carcinoma that is negative for oestrogen and progesterone receptors, but is positive for HER2/neu. One axillary lymph node demonstrates micro-metastases. Her 32 year old sister is found to have a similar lesion. Which of the following statements regarding risk factors for this lesion is the most appropriate?

- 1) A history of late menarche is likely to be present in females in this family [0]
- 2) Fibrocystic changes were present for many years [0]
- 3) She had a history of exposure to hydrocarbon compounds [0]
- 4) She has a positive antinuclear antibody test [0]
- 5) These findings suggest a BRCA-1 mutation [100]

A small number of breast cancers are the result of an inherited BRCA-1 mutation (or BRCA-2), but the family history of breast cancer at a young age makes this more likely. Early menarche and late menopause and nulliparity are risks for breast cancer. Autoimmune diseases do not appreciably increase the risk for breast cancer.

7- A firm 2 to 3 cm mass is palpable in the upper outer quadrant of the right breast of a 52-year-old woman. There are no palpable axillary lymph nodes. A lumpectomy with axillary node dissection is performed and the breast lesion is found to have positive immunohistochemical staining for HER2/neu (c-erb B2). Staining for oestrogen and progesterone receptors is negative. Which of the following additional treatment options is most appropriate, based upon these findings?

- 1) Radical mastectomy [0]
- 2) St John's wort [0]
- 3) Tamoxifen [0]
- 4) Trastuzumab [100]
- 5) Vancomycin [0]

This is an infiltrating ductal carcinoma. The lack of Oestrogen Receptor staining suggests a poor response to hormonal therapy with tamoxifen. The positive C-erb B2 (HER2/neu) staining suggests that trastuzumab (Herceptin) may be effective.

8- A 64-year-old man is found to have squamous cell bronchogenic carcinoma. Which of the following statements is true regarding surgical resection?

- 1) An FEV1 of 2 L is a major contraindication to surgical resection. [0]
- 2) Hypercalcaemia makes further assessment for surgery unnecessary. [0]
- 3) Is precluded if a CT scan of the thorax shows enlarged mediastinal lymph nodes. [100]
- 4) Positive sputum cytology excludes the need for bronchoscopic examination of the airways. [0]
- 5) The presence of finger clubbing indicates that liver metastases are already present. [0]

Mediastinal lymphadenopathy is usually associated with a poor prognosis, although there may be a role for surgery and adjuvant chemotherapy in those with metastasis to ipsilateral mediastinal lymph nodes and subcarinal lymph nodes (N2).

Bronchoscopy is useful to identify involvement of carina or if tumour is within 2 cm of the carina which means the cancer is inoperable.

Patients are clearly operable on the basis of spirometry if FEV1 is greater than 1.5 litres for lobectomy and greater than 2 litres for pneumonectomy. For those with worse spirometric function may need full pulmonary function including transfer factor, and exercise testing.

Finger clubbing is related to HPOA, which is a non-metastatic manifestation of malignancy.

Hypercalcaemia may be associated with parathyroid-hormone related peptide production associated with squamous cell carcinoma (non-metastatic manifestation of malignancy).

ENT

1- Which of the following statements regarding hiccup is true?

- 1) Is caused by a tonic relaxation of the diaphragm. [0]
- 2) May be caused by local irritation to the vagus nerve. [0]
- 3) Can reliably be treated with theophylline. [0]
- 4) May be caused by a posterior fossa tumour. [100]
- 5) May be caused by a foreign body in the nose. [0]

Hiccup is caused by frequent or rhythmic clonic contraction of the diaphragm. When prolonged, other causes should be considered including:

CNS disease: Posterior fossa tumour, brain injury, encephalitis.

Phrenic nerve or diaphragm irritation: Tumour, pleurisy, pneumonia, intrathoracic adenopathy, pericarditis, gastro-oesophageal reflux, oesophagitis.

Systemic causes: Alcohol intoxication, uraemia.

Other: Foreign body or insect in the ear. In infants it may be associated with apnoea or hyperventilation.

Folk remedies include aerophagia, breath holding, pharyngeal stimulation, distraction.

Haloperidol, metaclopramide and several anaesthetic agents are also said to work.

2- A 14 year old boy presents with a high fever, cervical lymphadenopathy, and pus on the tonsils. Which of the following statements regarding diagnosis and management is true?

- 1) If urinary red cells are present, then a renal biopsy is indicated. [0]
- 2) If his CRP is 40, then Group A Streptococcal infection is highly likely. [0]
- 3) Amoxycillin may cause an erythematous rash. [100]
- 4) Cefotaxime is the treatment of choice. [0]
- 5) Tonsillectomy is indicated after the acute infection has settled. [0]

This is a common problem in Paediatrics, general practice and medical admissions, and unfortunately on clinical appearances it is not possible to distinguish bacterial from viral or throat infections with any degree of liability. Urinary red cells may indicate a secondary post-Streptococcal glomerulonephritis, but a renal biopsy is unlikely to be indicated. A Group A Streptococcal infection should certainly be considered in this case, and probably covered with oral penicillin-v, but reliable clinical diagnosis is not possible. If the child has EBV infection, then the administration of Amoxycillin will give an erythematous rash. Non-vomiting patients can be treated with oral penicillin-v. Cefotaxime, although it would probably be effective, requires IV administrations, which does not seem warranted on the information given. Tonsillectomy should be reserved for those with recurrent tonsillitis not responding to prophylactic antibiotics.

Orthopaedics

1- A 64-year-old man is admitted with a right femoral neck fracture following a fall. Also seen in the radiograph of the pelvis are several prominent calcified vessels. What is the most appropriate next step in management of this finding?

- 1) anticoagulate with heparin [0]
- 2) Ignore it [100]
- 3) Order a pulmonary ventilation-perfusion scan [0]
- 4) Request a serum troponin test [0]
- 5) Start the patient on a nitrate infusion [0]

This finding is typical for Monckeberg's calcific medial sclerosis, a benign condition involving muscular arteries of older persons.

Urology

1- Which of the following is a feature of cystinuria?

- 1) accumulation of cystine in the kidney [0]
- 2) a useful response to acidification of urine [0]
- 3) autosomal dominant inheritance [0]

- 4) excessive urinary arginine excretion [100]
- 5) radiolucent urinary calculi [0]

Cystinuria is the commonest inborn error of amino acid transport. Amino acids excreted in urine are cystine, ornithine, arginine and lysine (mnemonic - COAL). The renal stones are radio-opaque due to the presence of sulphur. It is inherited as an autosomal recessive condition. Management includes alkalinization along with high fluid intake (>4 L/day); d-penicillamine may also be used.

It is cystinosis that leads to accumulation of cystine in the kidney

Unassigned

1- A 34 year old male presents with episodes of breathlessness on exertion. Examination reveals a loud P2 and fixed splitting of the second sound. Which of the following may be responsible for these signs?

- 1) Excess maternal alcohol consumption [100]
- 2) Homocystinuria [0]
- 3) 47 XXY karyotype [0]
- 4) Maternal chicken pox infection [0]
- 5) Maternal thalidomide therapy [0]

Fetal alcohol syndrome, Down's syndrome and Congenital rubella syndrome are associated with an ASD as described in this case with a loud second sound plus fixed splitting.

2- With which of the following is hyperprolactinaemia associated?

- 1) Cabergoline therapy [0]
- 2) Depression [0]
- 3) Fluoxetine therapy [100]
- 4) Hyperthyroidism [0]
- 5) Sheehan's syndrome [0]

Hyperprolactinaemia may be manifest by a milky discharge from the breasts. Causes include, prolactinoma, hypothyroidism (far increased TRH), Non-functional tumour with stalk compression and drugs in particular dopamine antagonists such as chlorpromazine, haloperidol and domperidone. Pregnancy is a particularly common cause of hyperprolactinaemia. Other drugs that are occasionally reported include SSRIs. PCOs is often associated with idiopathic hyperprolactinaemia.

3- A 23 year old female presents with a problem with her nails. Over the last 2 months they have become rather unsightly and brittle. She has taken a selection of medications for acne. Examination reveals onycholysis. Which of the following preparations may be responsible for the onycholysis?

- 1) Topical Benzoic acid [0]
- 2) Tetracycline [100]
- 3) Isotretinoin [0]
- 4) Dianette [0]

5) Erythromycin [0]

Tetracycline is a recognised cause of onycholysis together with eczema, psoriasis and thyrotoxicosis to name but a few.

4- A 45-year-old Chinese man is found incidentally to have a severely hypochromic and microcytic blood picture, with Hb 11.2g/dl. He is asymptomatic. Which of the following is the most discriminatory investigation?

- 1) Barium enema [0]
- 2) Gastroscopy [0]
- 3) Haemoglobin electrophoresis [100]
- 4) Bone marrow biopsy [0]
- 5) Ham test [0]

(-Thalassaemia trait is a common, usually asymptomatic abnormality. Red cells are hypochromic and microcytic, but iron and ferritin stores are normal. Haemoglobin electrophoresis shows raised HbA₂ (>3.5%) and raised HbF (normally consist predominantly of HbA with trace of HbF and HbA₂).

5- A 48-year-old man with malaise and abdominal pain is found to have a raised serum bilirubin of 60μmol/L. The provocation test with intravenous nicotinic acid is positive. What is the best course of action?

- 1) Corticosteroid [0]
- 2) Sphincterotomy with endoscopic retrograde cholangiopancreatography (ERCP) [0]
- 3) Cholestyramine [0]
- 4) Reassure patient [100]
- 5) Ursodeoxycholic acid [0]

This patient has Gilbert's syndrome, which is a familial mild unconjugated hyperbilirubinaemia with an excellent prognosis. It is probably autosomal dominant. There are a number of abnormalities with bilirubin handling including hepatic uptake and conjugation. Investigations show a rise in unconjugated bilirubin on fasting, or by nicotinic acid. Reassure patient that condition is common and benign.

6- Which of the following is most associated with prolonged QT interval?

- 1) hypercalcaemia [0]
- 2) hyponatraemia [0]
- 3) hyperthyroidism [0]
- 4) hypocalcaemia [100]
- 5) hypomagnesaemia [0]

Hypocalcaemia causes prolonged QT interval due to an increase in ST-segment duration. Other causes of prolonged QT interval are hypothermia, hypothyroidism, drugs (amiodarone), acute myocarditis, cerebral injury, mitral valve prolapse and HOCM.

7- Which of the following has the greatest specificity for Wegener's granulomatosis?

- 1) pANCA and positive antibodies to myeloperoxidase [0]
- 2) atypical ANCA and positive antibodies to myeloperoxidase [0]
- 3) cANCA and positive antibodies to myeloperoxidase [0]
- 4) cANCA and positive antibodies to proteinase 3 [100]
- 5) cANCA and positive antibodies to lactoferrin [0]

When requesting an ANCA test, both immunofluorescence and an ELISA test are generally performed. On immunofluorescence, if ANCA are present, the staining pattern may be cytoplasmic (cANCA) or perinuclear (pANCA). Typical antigen specificity includes proteinase 3 or myeloperoxidase. cANCA and specificity for the PR-3 antigen is most specific for Wegener's granulomatosis. This pattern is also seen in microscopic polyarteritis nodosa and rarely Churg-Strauss syndrome. pANCA and MPO are less specific findings detected in various vasculitic illnesses and occasionally in chronic infections.

8- Which of the following concerning Diabetic retinopathy is correct?

- 1) Is unusual in type 2 diabetic patients [0]
- 2) Improved glycaemic control is more effective than hypertensive control in reducing progression of disease. [0]
- 3) Normal visual acuity is seen in Proliferative retinopathy. [100]
- 4) Progression may be reduced with statin therapy [0]
- 5) Soft exudates are a feature of background retinopathy. [0]

Diabetic retinopathy occurs in both type 1 and 2 DM and may be a presenting feature in Type 2 as the condition may have existed for many years prior to diagnosis. Progression may be slowed with improved glycaemic and hypertensive control but the latter has been shown to be more effective at reducing progression (UKPDS). There are no data at present to suggest that Statin therapy reduces disease progression. Soft exudates are a feature of pre-proliferative RN and despite quite marked new vessel disease the visual acuity may be normal.

9- Adequate randomisation can be assumed in which of the following circumstances?

- 1) All consecutive patients attending a tertiary referral centre. [0]
- 2) A sample using healthy volunteers. [0]
- 3) A sample of those judged to be appropriate for inclusion in the study. [0]
- 4) A sample based on a family cluster. [0]
- 5) A stratified random sample. [100]

The actual patients included in the study often differ substantially from what was initially intended. This dramatically alters one's interpretation of a study. The target population includes all those with a given disease, and is seldom fully accessible. The accessible population available for study may be biased in time or place. It is important to randomise when selecting a sample which are supposed to represent the target population. In simple randomisation, every member of the population is numbered, and a random sample is selected. In a stratified random sample, groups of interest are identified, and then randomisation occurs within those groups. In

systematic sampling a "periodic" approach is used. This is not really random and is open to alteration and bias. In a cluster sample, a natural grouping of population is used (such as a family), but this may well be unrepresentative of the whole population. Classic errors in randomisation are:

Consecutive sampling, which may well not be representative if the study time is short.
Convenience sampling: strong potential for bias, with volunteers generally healthier than others.

Judgmental sample: including those that you want only. The potential for systematic error is enormous.

10- A 50 year old man presents with a 2 month history of progressive painless weakness affecting the proximal arms and legs. He has noticed difficulty getting out of a low chair and some dysphagia but denies any rashes or visual symptoms. Investigations shows a CPK of 5000IU/l. Which of the following is the most likely diagnosis?

- 1) Myasthenia gravis [0]
- 2) Polymyalgia rheumatica [0]
- 3) Polymyositis [100]
- 4) Hypothyroidism [0]
- 5) Guillan-Barre syndrome [0]

Polymyositis classically presents with relatively painless progressive proximal muscle weakness. Dysphagia is common but the ocular muscles are never involved unlike myasthenia gravis. Diagnosis is confirmed by elevated muscle enzymes and typical EMG and muscle biopsy findings. PMR is characterised by marked proximal stiffness and pain but not weakness and the muscle enzymes are normal. Although hypothyroidism can present with a proximal myopathy and elevated CPK levels the latter are rarely elevated above 500IU/l and dysphagia would not be typical.

11- Which one of the following statements relate to acquired sideroblastic anaemia?

- 1) It is characterised by the presence of ringed sideroblasts in the peripheral blood [0]
- 2) It shows increased haptoglobin [0]
- 3) There may be some response to pyridoxine therapy [100]
- 4) has increased methaemoglobinaemia [0]
- 5) haemosiderinuria is a feature [0]

Sideroblasts are found in marrow. Haptoglobin falls during haemolysis and may climb with "acute phase" response. There is an occasional response to pyridoxine. Methaemoglobinaemia and haemosiderinuria are features of intravascular haemolysis (Dr Bob Dalton)

12- A 17-year-old girl complains of feeling tired and lethargic for the last 6 months. She also has generalized abdominal discomfort and constipation. She denies depression but her performance at school has deteriorated this year. Examination shows a pale and thin young woman. BP 110/60.

Hb 13.4 g/l
WBC 4.8 x 10⁹
Platelet 290 x 10⁹
ESR 37mm/hr
Na 131mM
K 2.7mM
Urea 3.0mM
Creat 90mM
Bicarbonate 35mM
Alkaline phosphatase 90iu/l
bilirubin 12
AST 30 iu/l
Albumin 36g/l
CXR normal

Which of the following is the most likely underlying diagnosis?

- 1) Cushings syndrome [0]
- 2) Conns syndrome [0]
- 3) Addisons disease [0]
- 4) Anorexia nervosa [100]
- 5) Phaeochromocytoma [0]

This patient has anorexia nervosa with self-induced vomiting, which would explain the low Na, K and alkalosis. Addisons disease cause hyponatraemia and hyperkalaemic acidosis, whilst Cushings disease cause hypokalaemic alkalosis. The clinical presentation does not fit with the latter. Conn's syndrome (adrenal adenoma) is associated with hypertension and hypokalaemia.

13- A 45-year-old woman is admitted with a spiking temperature and sweats. She has been unwell for the last 3 weeks with flitting arthralgia and lethargy. There is a rash over her trunk which is most prevalent in the mornings. Blood cultures are sterile. Her recent transthoracic echocardiogram is normal. ESR 56mm/hour. Her ferritin is elevated at 6000(g/l. Autoimmune screen is negative.

- 1) bacterial endocarditis [0]
- 2) systemic lupus erythematosus [0]
- 3) rheumatoid arthritis [0]
- 4) adult onset Stills disease [100]
- 5) meningitis [0]

It is a febrile syndrome in young adults (16-35 years) which affects multiple organs. The diagnosis is mainly one of exclusion. The clinical features include high spiking fever, (x1/day, with return of temp to normal), arthralgia/arthritis, sore throat, transient maculopapular rash (mildly pruritic in 1/3), lymphadenopathy, hepatosplenomegaly and pleuritis/pericarditis. Rarely there may be aseptic meningitis, cranial nerve palsies, iritis and peripheral neuropathy. There is often delay in diagnosis. Hyperferritinaemia (>5X normal) is present in 90% of cases.

14- A 38 year old female presents with red target lesions confined to the hands and is diagnosed with erythema multiforme. Which of the following could be the cause?

- 1) Cytomegalovirus infection [0]
- 2) Ureaplasma urealyticum [0]
- 3) Group B Streptococci [0]
- 4) Langerhan's cells histiocytosis [0]
- 5) Penicillin V [100]

Potential causes of erythema multiforme include:

INFECTIONS:

viruses: herpes simplex 1 and 2, hepatitis B, EBV, enteroviruses.

small-agents: mycoplasma pneumoniae.

bacteria: Group A Streptococcus, eosinophilia.

other: mycobacterium TB, histoplasma, coccidioides.

NEOPLASIA:

leukaemia

lymphoma.

ANTIBIOTICS:

penicillins, sulphonamides, isoniazid, tetracycline.

ANTICONVULSANTS:

phenytoin, phenobarbitone, carbamazepine.

OTHER:

aspirin, radiation therapy, etoposide, NSAIDs, sunlight, pregnancy.

15- Which ONE of the following is a recognised feature of achondroplasia?

- 1) Autosomal recessive inheritance [0]
- 2) May be diagnosed radiologically at birth [100]
- 3) Increased liability to pathological fractures [0]
- 4) Shortened spine [0]
- 5) Subfertility [0]

ACHONDROPLASIA is an autosomal dominant condition and one of the commonest forms of inherited dwarfism. Epiphyseal dysplasia - thin zone of cartilage cells, diminished columnar arrangement short thick bones, spinal length almost always normal. Features - short limbs, normal trunk, large head, saddle nose, exaggerated lumbar lordosis normal mental and sexual development, spinal problems.
Homozygotes - neonatal death (Harrisons)

16- Which of the following statements regarding the sweat test is true?

- 1) Sweating is enhanced by application of atropine. [0]
 - 2) The filter paper is left on for a total of about 4 hours. [0]
 - 3) At least 25mg of sweat is necessary for a reliable result. [0]
 - 4) More than 60mmol/L of chloride in sweat is diagnostic of cystic fibrosis. [100]
 - 5) False/positive results may be encountered in children with nephrotic syndrome. [0]
-

The sweat test is conducted using pilocarpine iontophoresis. A 3mA current carries pilocarpine into the skin of the forearm stimulating local sweating. The arm is washed with distilled water and sweat collected on a filter paper or gauze. The duration of collection is usually 30-60 minutes. The filter paper is removed, weighed and eluted in distilled water. At least 50mg and preferably 100mg of sweat should be collected for reliable results. It may not be possible to collect this amount in young infants. More than 60mmol/L of chloride is diagnostic of CF when one or more other criteria are present. In healthy adults, the sweat chloride values increase slightly, but 60mmol/L still differentiates CF from other conditions. False/negative results may be encountered in nephrotic syndromes.

17- Which of the following is true regarding sensory neural hearing loss?

- 1) The incidence is twice as high in babies admitted to neonatal intensive care units compared with the normal population. [0]
- 2) The risk is increased in children who have had rubella. [0]
- 3) Approximately 1 per 1000 children will have greater than 40db hearing loss. [100]
- 4) The risk is increased in Noonan's Syndrome. [0]
- 5) The risk is increased in Down's Syndrome. [0]

Sensory neural hearing loss is caused by lesions in the cochlea or the auditory nerve or central connections. It may be unilateral or bilateral. Language acquisition and secondary educational difficulties follow, with social isolation, and an increased risk of mental health problems. The approximate incidence is 1 per 1000 children. Risk factors include:

NICU admission: low birth weight, less than 32 weeks gestation, prolonged ventilation, prolonged jaundice, ototoxic drugs, hypoxic ischaemic encephalopathy, neonatal meningitis.
Congenital infection (rubella, CMV).
Dysmorphic syndromes (affecting head and neck).
Family history of a close relative needing a hearing aid below the age of 5 years.
Infections: acute bacterial or TB meningitis, mumps (latter usually unilateral).
If all risk factors are considered, only around 50% of cases could be identified by testing between 5 and 10% of all babies. Conductive hearing loss is related to middle ear pathology. This is commoner in Down's Syndrome, cleft palate, Turner's Syndrome, and facial malformation syndromes.

18- A 24-year-old man with chronic diarrhoea and malabsorption is suspected of having coeliac disease. A jejunal biopsy is taken. Which of the following findings would be expected in coeliac disease?

- 1) Shows leaf-shaped villi [0]
 - 2) Shows flattening of the crypts [0]
 - 3) Appearances may resemble severe tropical sprue [100]
 - 4) Shows fissures penetrating into the submucosa [0]
 - 5) Characteristically shows epithelial cells distended with fat globules [0]
-

In coeliac disease, the villi are shortened and the crypts lengthened with increased lymphocytic infiltrate. Tropical sprue may also cause subtotal villous atrophy. Fissures are not found and epithelial cells are normal.

19- An 18 year old Asian female is noted to have gingival hypertrophy by her dentist. Which of the following is most likely to be responsible for her presentation?

- 1) carbamazepine [0]
- 2) scurvy [0]
- 3) lead poisoning [0]
- 4) phenytoin [100]
- 5) sodium valproate [0]

The inclusion of 'asian' descent in this question is intended as a distractor. Gum hypertrophy may be seen in conditions such as acute myeloid leukaemias and with drugs such as phenytoin. Scurvy (vitamin C deficiency) is associated with bleeding gums. Lead toxicity is associated with pigmentation of the gingiva. Carbamazepine is not associated with gingival hyperplasia but recognised SEs include ataxia, drowsiness and blood dyscrasias.

20- Which of the following are true of chronic renal failure in childhood?

- 1) is unlikely to be due to chronic pyelonephritis unless there is a clear history of an acute attack [0]
- 2) if accompanied by renal osteodystrophy is likely to be associated with severe hypertension [0]
- 3) is an unusual sequel of acute post-streptococcal glomerulo-nephritis [100]
- 4) is the most common sequel to the nephrotic syndrome [0]
- 5) is likely to be benefited by administration of corticosteroids [0]

CRF may occur in childhood as a consequence of inherited disorders such as Alport's from recurrent infection and reflux disease. Renal function usually resolves post-strep GN.

21- Compared with bottle feeding, breast feeding is relatively protective against which of the following?

- 1) Late haemorrhagic disease of the newborn [0]
- 2) Maternal breast cancer [100]
- 3) Late onset diabetes [0]
- 4) Prolonged jaundice [0]
- 5) Under-feeding [0]

Breast fed infants have a reduced risk of infection, though the effect is less in industrialised societies. The protective effect is increased for low birth weight infants. There may also be improved cognitive and psychological development, reduced risk of juvenile onset diabetes, and reduced risk of maternal breast cancer. Disadvantages of breast feeding includes social limitations, unrecognised under-feeding (rare), late haemorrhagic disease of the newborn, and breast milk jaundice.

22- A 25-year-old woman is admitted with a 4-month history of cough productive of mucoid sputum streaked with bright red blood, wheezing and diarrhoea. Her chest and abdominal examination is normal. Which of the following investigation is the most discriminatory?

- 1) Bronchoscopy [100]
- 2) Chest X-ray [0]
- 3) Computed tomography (CT) of chest [0]
- 4) Echocardiogram [0]
- 5) Ventilation-perfusion scan [0]

Bronchial carcinoid is a highly vascular 'cherry-like' tumour causing recurrent haemoptysis and bronchial obstruction. It may rarely produce the classical symptoms of carcinoid syndrome such as cyanotic flushings, intestinal cramps and diarrhoea following liver metastases in 5% cases. Bronchoscopy identifies up to 80% of carcinoid tumours in the main bronchi. Biopsy is usually followed with brisk bleeding and should be done via rigid bronchoscopy.

23- Which of the following stimulate the generation of cyclic AMP as the second messenger?

- 1) Nitric Oxide [0]
- 2) Rosiglitazone [0]
- 3) Tissue Necrosis Factor (TNF) alpha [0]
- 4) Cholera toxin [100]
- 5) Growth hormone [0]

Nitric oxide generates cGMP as the second message and rosiglitazone acts through agonism of PPAR gamma. Calcitonin Cholera toxin binds to the Ganglioside receptors and causes excessive production of cAMP which leads to the activation of luminal sodium pumps and the secretory diarrhoea.. GH like TNF alpha acts on the GH/cytokine superfamily of receptor which function via the JAK-STAT pathway.

24- Which of the following is a recognised cause of acute renal failure?

- 1) Burns [100]
- 2) Dermatomyocytis [0]
- 3) Duchenne muscular dystrophy [0]
- 4) Penicillin therapy [0]
- 5) Alport's Syndrome [0]

Causes of acute renal failure can be divided into pre-renal, renal and post-renal.

Pre-renal:

Hypovolaemia (gastroenteritis, burns, sepsis, haemorrhage, Nephrotic Syndrome).

Circulatory failure.

Renal:

Vascular: HUS, vasculitis, embolus, renal vein thrombosis.

Tubular: acute tubular necrosis, ischaemic, toxic, obstructive.

Glomerular: glomerulonephritis.

Interstitial: interstitial nephritis, pyelonephritis.

Acute chronic renal failure.

Post-renal:

obstruction, either congenital or acquired. Although Alport's Syndrome is associated with end stage renal failure, this usually progresses gradually so that it occurs in adult life.

25- A 45-year-old man presents with unsteadiness and recurrent falls. Which of the following is LEAST associated with gait ataxia?

- 1) normal pressure hydrocephalus [0]
- 2) pituitary tumours [100]
- 3) bronchial carcinoma without metastases [0]
- 4) phenytoin treatment [0]
- 5) infarction of non-dominant parietal lobe [0]

Normal pressure hydrocephalus presents classically in the elderly as incontinence, ataxia and dementia. Cerebellar syndromes can result from phenytoin therapy and non-metastatic manifestations of malignancy. A parietal lobe lesion may produce ataxia, hemiparesis or agnosia/apraxia.

X-papers

1- A 52 year old man with a diagnosis as a child of coeliac disease had been asymptomatic despite poor dietary compliance. He presents with a one month history of intermittent, colicky, central abdominal pain and 3 kilogram weight loss and positive faecal occult bloods. What is the most appropriate investigation?

- 1) Anti-endomysial antibody. [0]
- 2) Colonoscopy. [100]
- 3) CT scan of abdomen. [0]
- 4) Distal duodenal biopsy. [0]
- 5) Small bowel enema. [0]

New-onset weight loss, with positive faecal occult bloods and central abdo pain in a 52-year-old man must be assumed to be colonic carcinoma until proven otherwise. Colonoscopy is the best way to check for this and would also demonstrate inflammatory bowel disease if present. If the colonoscopy were negative, then an OGD would be needed to check for upper GI malignancy.

2- A 25-year-old Turkish woman arrived in the UK with a three month history of weight loss and intermittent fevers. On examination, the patient was emaciated, febrile (39°C) and pale, and an enlarged liver (5 cm below the costal margin) and spleen (10cm below the costal margin) were present. Investigations revealed:

Haemoglobin 7.2g/dL (11.5-16.5)

White cell count $2.4 \times 10^9/L$ (4-11)

Platelet count $117 \times 10^9/L$ (150-400)

Thick and thin films no parasites identified

CXR normal

What is the most likely diagnosis?

- 1) HIV infection [0]

- 2) Infectious mononucleosis [0]
- 3) Malaria [0]
- 4) Miliary tuberculosis [0]
- 5) Visceral leishmaniasis [100]

The ethnic origin and clinical history are typical of visceral leishmaniasis. The causative agent is usually *Leishmania donovani*. Fever, malaise, weakness and weight loss are common. Hepatosplenomegaly develops gradually and may be massive. With time, the skin develops a grey colour, and gives rise to the Indian name of the disease –'kala-azar' – meaning black fever. Anaemia is a common finding and may be severe.

3- A 50 year old woman presented with a recently discovered, solitary, thyroid nodule.

Which of the following would suggest a diagnosis of thyroid malignancy?

- 1) Elevated serum thyroglobulin concentration. [0]
- 2) Features of thyrotoxicosis. [0]
- 3) Ipsilateral Horner's Syndrome [100]
- 4) Previous iodine 131 therapy. [0]
- 5) Tenderness over the nodule. [0]

The association of Horner's syndrome and a thyroid nodule would suggest invasion of the sympathetic chain and would suggest that this thyroid nodule is malignant. Previous I131 is not associated with the development of malignancy. Thyroglobulin may be elevated in any thyroiditis. Tenderness over the nodule would suggest a thyroiditis and thyrotoxicosis suggest a functional adenoma making the malignancy extremely unlikely.

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5- A 30-year-old man developed a febrile illness three days after returning from a holiday in Thailand. He was admitted complaining of severe myalgia. On examination he was febrile (39°C) with a diffuse macular rash on the trunk. There was no lymphadenopathy. Investigations revealed:

Haemoglobin 15.1 g/dL (13.0-18.0)
White cell count 7.5 x 10⁹/L (4-11)
Platelet count 105 x 10⁹/L (150-400)
Serum total bilirubin 18 µmol/L (1-22)
Serum alanine aminotransferase 120 U/L (5-35)

What is the most likely diagnosis?

- 1) Acute HIV infection (seroconversion illness) [0]
- 2) Dengue fever [100]
- 3) Hepatitis E [0]
- 4) Secondary syphilis [0]
- 5) Typhoid [0]

The symptoms are most consistent with dengue fever. While acute retroviral syndrome (acute HIV) is associated with a widespread macular rash, it is also usually associated with pharyngitis and generalised lymphadenopathy. Hepatitis E presents in a similar manner to hepatitis A, i.e. as an acute febrile illness with jaundice. The history is too acute for secondary syphilis, which is not typically associated with myalgia. Typhoid fever is usually a diarrhoeal illness associated with subtle 'rose spots' on the abdomen.

Dengue fever is caused by an arthropod-borne flavivirus. The disease has an incubation period of approximately 7 days, followed by headaches and retro-orbital pain. Symptoms evolve rapidly and severe musculoskeletal pain is a prominent feature, with a maculopapular rash.

MRCP 1

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5- A 40-year-old man has a history of left-sided Crohn's colitis. Though, previously treated with steroids and mesalazine, he has had several relapses in the past year. The last relapse, treated with high doses of steroids, was complicated by gastric bleeding. Investigations show:

Haemoglobin 10.8 g/L (13.0-18.0)

MCV 76 fL (80-96)

MCH 24 pg (28-32)

White cell count $10 \times 10^9/L$ (4-11)

Platelets $400 \times 10^9/L$ (150-400)

Serum total protein 70 g/L (61-76)

Serum albumin 30 g/L (37-49)

Serum CRP 30 mg/L(<10)

Abdo X-ray normal

Which of the following is the most appropriate management?

- 1) A trial of oral metronidazole for three months. [0]
- 2) Total colectomy with ileostomy construction. [0]
- 3) Total colectomy with pouch construction. [0]
- 4) Treatment with azathioprine. [100]
- 5) Treatment with oral budesonide. [0]

This patient has all the hallmarks of active Crohn's colitis that is failing to settle with first-line medical therapy. The next step is a trial of azathioprine, which is used as a steroid-sparing agent. This is particularly relevant to this particular patient, as he has had a serious side-effect from previous steroid treatment. Metronidazole is rarely effective in the treatment of active Crohn's colitis. Given that Crohn's disease can recur following surgery, an operation should not be embarked upon without first a trial of the second-line medical therapies such as azathioprine, its metabolite 5-mercaptopurine, or infliximab.

6- A 50 year old woman presented with a recently discovered, solitary, thyroid nodule.

Which of the following would suggest a diagnosis of thyroid malignancy?

- 1) Elevated serum thyroglobulin concentration. [0]
- 2) Features of thyrotoxicosis. [0]
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7- A 54-year-old woman presented with an eighteen month history of chest pain and dysphagia for both solids and liquids. She smokes 20 cigarettes per day and drinks 16 units of alcohol per week. Clinical examination was normal. What is the most likely diagnosis?

- 1) Achalasia. [100]
- 2) Bronchial neoplasm. [0]
- 3) Oesophageal neoplasm. [0]
- 4) Oesophageal web. [0]
- 5) Pharyngeal pouch. [0]

A longstanding history of dysphagia to both solids and liquids suggests a functional rather than mechanical cause for the dysphagia. Hence a neoplasm or other obstructive lesion is unlikely. Chest pain is not a typical feature of a pharyngeal pouch. Achalasia, in which there is failure of oesophageal peristalsis and of relaxation of the lower oesophageal sphincter, typically causes the symptoms described above.

8- A 24 year old woman was referred with tiredness and intermittent bloody diarrhoea and a past history of cerebral venous thrombosis. On examination, the sclera of the right eye was inflamed, and multiple mouth ulcers were noted. At the colonoscopy, which confirmed colitis, two large vulval ulcers were noted. Which is the most likely diagnosis?

- 1) Behcet's disease. [100]
- 2) Crohn's disease. [0]
- 3) HIV infection [0]
- 4) Syphilis [0]
- 5) Ulcerative colitis. [0]

A classical description of the presentation of Behcet's, with oral and genital ulceration, colitis and scleritis.

2000 May

1- A 30 year old female presents with mild galactorrhoea. Biochemistry reveals an elevated prolactin of 1200 mu/l (NR 50-450) and an oestradiol concentration of 100 pmol/l (NR 130-450). Which of the following is the likely cause?

- 1) Addison's disease [0]
- 2) Hyperthyroidism [0]
- 3) Non-functioning pituitary tumour [100]
- 4) Sheehan's syndrome [0]
- 5) Post-cranial irradiation for acute lymphocytic leukaemia as a child [0]

Addison's may be associated with hypogonadism but prolactin concentrations are usually normal. Severe hypothyroidism is associated with HyperPRL hypogonadism. A NFPT may cause hyperprolactinaemia through stalk compression. Sheehan's syndrome is associated with a low prolactin concentration. Cranial irradiation may initially cause hyperprolactinaemia but a low PRL is typical after a year.

2000 September

1- Which of the following statements regarding cryptogenic fibrosing alveolitis is correct?

- 1) Active inflammation may be suggested by a CT scan [100]
- 2) peak flow rate is a good guide to severity [0]
- 3) 80 per cent of patients initially respond well to immunosuppression [0]
- 4) peak incidence seen in the fourth decade [0]
- 5) lung volumes show a raised residual volume / total lung capacity ratio [0]

a - also the presence of a predominantly ground glass appearance is an independent predictor of survival. b - Peak flow measure airway obstruction. CFA is characterised by a restrictive defect on lung function testing. c - About 50% of patients have an improvement in their symptoms with steroids and 25% have improved lung function. d - peak incidence is in the 6th decade e - residual volume (RV) increases with airways obstruction, total lung capacity (TLC) reduces with restrictive disorders like CFA. A raised RV/TLC ratio suggests a combination of airways obstruction and restrictive defect NOT just CFA as mentioned in this question. (Read more ...)

http://www.safetyline.wa.gov.au/institute/level2/course21/lecture107/1107_04.asp

2- Which statement is true regarding Gabapentin?

- 1) is a potent hepatic enzyme inducer [0]
- 2) side effects typically include visual field defects with long-term use [0]
- 3) therapy is best monitored through measuring plasma concentrations [0]
- 4) is of particular value as monotherapy in absence attacks (petit mal) [0]
- 5) requires dose adjustment in renal disease [100]

Gabapentin does not induce cytochrome P450 unlike other anticonvulsants such as phenytoin and phenobarbitone. Vigabatrin may cause visual field defects, which may

be irreversible. Rarely have visual disturbances been associated with gabapentin. No use in Petit Mal and is used for add-on therapy in partial or generalised seizures.

3- On auscultation of the heart of a 30 year old female a loud first heart sound is heard. Which of the following may be responsible for this auscultatory feature?

- 1) a long preceding diastolic interval [0]
- 2) Atrial premature beat [100]
- 3) increased pulmonary arterial pressure [0]
- 4) increased systemic arterial pressure [0]
- 5) rupture of a papillary muscle [0]

A loud first heart sound is due to abrupt closure of the mitral valve against a high left atrial pressure and may occur with shortened diastole, mitral stenosis or left-right shunts. It can also be heard with atrial premature beats. MR occurs with papillary muscle rupture and thereby 1st heart sound is soft. A2 and P2 are loud in systemic HT and pulmonary hypertension respectively.

4- Which of the following is associated with Hyperuricaemia?

- 1) is usually due to an excess purine consumption [0]
- 2) occurs in association with acute lymphoblastic leukaemia [100]
- 3) in primary gout is inherited in an autosomal dominant manner [0]
- 4) can be reduced with low dose aspirin therapy [0]
- 5) can be treated with uricosuric drugs even in renal failure [0]

Hyperuricaemia may be due to increased purine intake, urate production or reduced urate clearance, and is most commonly due to the latter. Therefore it can occur in association with enhanced cell destruction particularly leukaemias. Primary gout has no obvious mode of inheritance, but familial juvenile gouty nephropathy is an autosomal dominantly inherited disorder. Low dose aspirin may exacerbate gout but high dose aspirin is uricosuric. Many of the uricosuric drugs may be detrimental in renal failure and may not be effective.

2001 January

1- Which of the following concerning the use of intravenous bicarbonate in cardiorespiratory arrest is correct?

- 1) exacerbates intracellular acidosis [100]
- 2) has a positive inotropic effect on ischaemic myocardium [0]
- 3) improves oxygen release to the tissues [0]
- 4) increases cerebral blood flow [0]
- 5) reduces pre-existent hyperkalemia [0]

Has negative inotropic effect, reducing cerebral blood flow, shifts oxygen dissociation curve to the left inhibiting oxygen release to tissues.

2- Which of the following is activated by Cholera toxin?

- 1) Adenylate cyclase [100]
- 2) Guanylate cyclase [0]

- 3) Peroxisome proliferator receptor (PPAR) gamma [0]
- 4) Sodium/potassium ATPase [0]
- 5) The glucose-sodium transporter [0]

Cholera toxin activates adenylate cyclase with generation of cAMP.

3- Which one of the following cardiac enzymes would be expected to increase between 12-24 hours after a myocardial infarction?

- 1) Aspartate transaminase [100]
- 2) Creatine kinase [0]
- 3) LDH [0]
- 4) Troponin I [0]
- 5) Troponin T [0]

AST starts to rise after 12 to 24 hours and LDH after 5 days. CK begins to rise after 4hrs, just like troponins although the troponins are far more specific.

2001 May

1- Which one of the following statements regarding renal function is correct?

- 1) The daily solute excretion will lie between 75 and 300 mosmol [0]
- 2) The permeability of the distal nephron to water increases in the presence of vasopressin [0]
- 3) The rate of ammonium excretion in urine is inversely related to the rate of urinary hydrogen ion excretion [0]
- 4) A ten minute period of hyperventilation will normally be expected to lead to an increased rate of bicarbonate excretion in urine [100]
- 5) Sodium reabsorption in the tubules is mainly controlled by aldosterone [0]

AVP acts on the collecting ducts increasing permeability to water. The total solute excretion is approximately 700 mosmol/d. Sodium reabsorption is mostly through active transport in the loop of Henle with only a modest reabsorption facilitated by aldosterone. A ten minute period of hyperventilation would cause a respiratory alkalosis leading to an increased secretion of bicarbonate and retention of Hydrogen ions. The rate of ammonium excretion is proportional to the rate of hydrogen ion excretion.

2001 September

1- Metabolic alkalosis is characteristically found in which of the following?

- 1) An infusion of sodium chloride [0]
- 2) Ileostomy [0]
- 3) Mineralocorticoid deficiency [0]
- 4) Pyloric stenosis [100]
- 5) Salicylate poisoning [0]

Pyloric stenosis is associated with vomiting and the loss of stomach content – hence a metabolic alkalosis. Mineralocorticoid excess (Conn's syndrome) is associated with a metabolic alkalosis. Ileostomy may be associated with a loss of bicarbonate ions and hence acidosis. Salicylates are themselves acidic and produce a metabolic acidosis. A sodium chloride infusion is neutral and does not alter pH.

2- A 62 year old male is noted to have a broad-based ataxic gait. This is characteristic of which of the following?

- 1) A basal ganglia lesion [0]
- 2) Cerebellar vermis lesion [0]
- 3) Osteomalacia [0]
- 4) phenytoin toxicity [100]
- 5) Right-sided cerebral infarction [0]

Broad based gait is associated with cerebellar syndrome. However, lesions of cerebellar vermis cause truncal ataxia and tendency to fall backwards. Right-sided cerebral infarction is associated with a hemiplegic gait. Basal ganglia disease causes extrapyramidal signs with Parkinsonism (festinant gait, marche à petit pas). Proximal myopathy causes a waddling gait.

3- A 65-year-old man, with a history of smoking, presents with chronic cough, haemoptysis and weight loss. His Chest X-Ray shows a cavitating lesion. What is the likely diagnosis?

- 1) adenocarcinoma [0]
- 2) alveolar cell carcinoma [0]
- 3) large cell carcinoma [0]
- 4) small cell carcinoma [0]
- 5) squamous cell carcinoma [100]

Squamous cell carcinomas characteristically present with cavitating lung lesions on Chest X-Ray and metastasize late. Other causes of cavitating lung lesions include infection (Staphylococcus aureus, tuberculosis, Klebsiella, Pneumocystis carinii), pulmonary infarcts, Wegener's Granulomatosis and Rheumatoid nodules.

4- Primary prevention trials for the treatment of hypercholesterolaemia reveal a reduction in all cause mortality following treatment with which of the following?

- 1) Fibrates [0]
- 2) Fish Oils [0]
- 3) Nicotinic acid [0]
- 4) Resins [0]
- 5) Statins [100]

Primary prevention refers to the prevention of cardiovascular disease in subjects without pre-existent IHD. Although many lipid lowering agents have demonstrated reductions in cardiovascular mortality, the question refers to all cause mortality. WOSCOPS (pravastatin) and AFCAPS-TextCAPS (lovastatin) demonstrated reductions in overall mortality not just cardiovascular mortality following treatment

with statins. None of the other agents are proven to reduce all cause mortality in primary prevention. Fibrates are however well proven in secondary prevention trials (BECAIT, VA-HIT).

5- A 75-year-old man with squamous cell carcinoma is thought to have resectable disease. Which of the following would be a contraindication to surgery?

- 1) clubbing [0]
- 2) FEV1 of 0.75 L [100]
- 3) his age of 75 years [0]
- 4) pleural effusion [25]
- 5) Syndrome of Inappropriate ADH [0]

Contraindications to surgery are proven metastases, mediastinal organ involvement, malignant pleural effusion (i.e. straw coloured, reactive effusions are not a contraindication if cytology is negative), contralateral mediastinal node involvement, FEV1 < 0.8 L, severe cardiac or other significant disease (e.g. cerebrovascular, renal, liver etc.).

6- A 20 year old female patient is referred with primary amenorrhoea. Investigations reveal a 46 XY karyotype. Which of the following concerning the condition is true?

- 1) It is likely that her mother received stilboestrel in pregnancy [0]
- 2) It is likely that her mother received Carbimazole for thyrotoxicosis during pregnancy [0]
- 3) Low testosterone and oestradiol concentrations would be expected [0]
- 4) The diagnosis is likely to be testicular feminisation syndrome [100]
- 5) The diagnosis is Noonan's syndrome [0]

A female phenotype can occur in testicular feminisation, a condition associated with androgen insensitivity due to an androgen receptor defect. Stilboestrel therapy has been associated with the induction of latent tumours and to influence sexual behaviour but is not associated with abnormalities of sexual identity. In Noonan's syndrome, infants are males but physical features resemble that found in Turner's syndrome. Neither prednisolone nor maternal thyrotoxicosis would cause gender mal-assignment problems.

7- A 24 year old asthmatic female is admitted with acute severe asthma. Which of the following statements regarding the diagnosis is correct?

- 1) Agitation should be managed with a benzodiazepine [0]
- 2) A high inspired Oxygen concentration should be used routinely [100]
- 3) Inhaled salmeterol is indicated as first line therapy [0]
- 4) Normal arterial pCO₂ is reassuring [0]
- 5) Pulsus paradoxus is a reliable sign of severity [0]

A normal or raised arterial pCO₂ is an indication of severe asthma. Pulsus paradoxus is not reliable and is not part of the criteria in assessing severity of asthma attack. Salmeterol is used in management of chronic asthma (Step 3). High dose oxygen (40-60%) should be used in severe asthma attack, together with steroids and nebulised

bronchodilators. Sedation must be avoided as it can cause respiratory failure and arrest.

8- Which of the following is true regarding chromosomes?

- 1) Down's syndrome is most commonly due to an extra copy of chromosome 21 inherited from the father. [0]
- 2) A Fetus with triploidy will have 47 chromosomes [0]
- 3) Heterochromatin is mostly composed of active genes [0]
- 4) The normal human karyotype consists of 22 pairs of autosomes [100]
- 5) Telomeres provide the point of attachment to the mitotic spindle [0]

The human karyotype consists of 22 pairs of autosomes and 1 pair of sex chromosomes. Down's syndrome is most commonly due to trisomy of C21 with the majority a consequence of non-dysjunction within the ovum. Trisomy results in 47 chromosomes whereas Triploidy is the presence of 3 complete sets of chromosomes instead of two in all cells. Heterochromatin is of little genetic significance containing mostly inactivated genes. Telomeres are the distal extremities of the chromosomal arms but the centromeres provide the point of attachment to the mitotic spindle.

9- Which of the following is a characteristic feature of primary hyperaldosteronism?

- 1) Gross oedema [0]
- 2) Hyponatraemia [0]
- 3) Muscular weakness [100]
- 4) Oliguria [0]
- 5) Vitiligo [0]

Primary hyperaldosteronism or conn's syndrome is characterised by hypokalaemic hypertension. Patients can present with tetany (alkalosis) and muscle weakness (hypokalaemia). Oedema, oliguria are more features of secondary hyperaldosteronism (cirrhosis) and vitiligo (suggesting auto-immunity) is not a feature.

10 -In active acromegaly with associated diabetes mellitus which of the following findings would be expected?

- 1) Diabetes mellitus is due to an auto-immune process [0]
- 2) Growth hormone concentrations are suppressed with hyperglycaemia [0]
- 3) IGF-1 concentrations are low [0]
- 4) There is insulin resistance [100]
- 5) Treatment with a somatostatin analogue is contra-indicated [0]

Insulin resistance stems from the excessive growth hormone concentrations (anti-insulin effects) that of course fail to suppress with hyperglycaemia. Acromegaly is often effectively treated with somatostatin analogues which may improve glycaemic control. Many of the effects of GH are mediated through IGF-1 whose concentrations are high in acromegaly. Diabetes mellitus is due to the insulin resistance and is not due to auto-immune insulinitis.

11- In which of the following have randomised controlled trials shown that long-term oxygen therapy (LTOT) reduces mortality?

- 1) Asthma [0]
- 2) Cor pulmonale due to chronic airflow obstruction [100]
- 3) Cryptogenic fibrosing alveolitis [0]
- 4) Cystic fibrosis [0]
- 5) Pulmonary sarcoidosis [0]

Adequate data for LTOT prolonging survival exists only for COPD although in practice it is assumed to apply in other chronic hypoxaemic lung conditions.

2002 January

1- Which of the following is a recognised feature of massive pulmonary embolism?

- 1) reduced plasma lactate levels [0]
- 2) an increase in serum troponin levels [100]
- 3) an arterial pH less than 7.2 [0]
- 4) blood gases show increased pCO₂ on air [0]
- 5) normal D-dimer levels [0]

Cardiac troponins are reliable markers of myocardial injury that are being used increasingly in patients presenting with undifferentiated chest pain or dyspnea to diagnose an acute coronary syndrome. If elevated cardiac troponin levels also occur in patients with pulmonary embolism because of right ventricular dilation and myocardial injury, such patients could be misdiagnosed. We performed a prospective cohort study to determine the prevalence of elevated cardiac troponin I (cTnI) levels in patients with submassive pulmonary embolism. METHODS: Consecutive patients with objectively confirmed submassive pulmonary embolism and no previous history of ischemic heart disease, other cardiac disease, or renal insufficiency were included. Creatine kinase and cTnI levels were measured within 24 hours of clinical presentation on 2 occasions 8 to 12 hours apart. RESULTS: Of 24 patients with submassive pulmonary embolism, 5 (20.8%) had elevated cTnI levels of 0.4 microg/L or higher (95% confidence interval, 7.1-42.2%). One of these patients had a cTnI level higher than 2.3 microg/L that was suggestive of myocardial infarction. CONCLUSION: Pulmonary embolism should be considered in the differential diagnosis of patients presenting with undifferentiated chest pain or dyspnea and an elevated cardiac troponin level. (Arch Intern Med, 162(1): 79-81 2002)

Hypoxemia and hypocapnoea are common after major pulmonary embolism and may also be found after more minor events. Absence of these phenomena, on the other hand, by no means excludes embolism and their presence is non-specific. In suspected minor embolism this investigation is, at best, only of marginal value. The precise stimulus to hyperventilation is unknown and there is also difficulty in understanding the reasons for hypoxaemia when it is present.

2- Which of the following statements about the spinal cord is true?

- 1) A lesion of the left side of the spinal cord at C5 causes pyramidal weakness of the right leg [0]

- 2) Centrally placed spinal cord lesions affect joint position sense before other modalities of sensation [0]
- 3) Conus medullaris lesions characteristically cause mixed upper and lower motor neurone signs in the legs [0]
- 4) The spinal cord ends at the lower border of the L3 vertebra [0]
- 5) The spinothalamic tracts are supplied principally by the anterior spinal artery [100]

At the pyramidal decussation (lower medulla), 85% fibres cross over forming the lateral corticospinal tract and the remaining forming the ventral corticospinal tract, the fibres of which eventually cross the cord. Hence, a lesion at left side of C5 will cause weakness of the left leg.

Central spinal cord lesions destroy contiguous structures like the anterior horn cells (lower motor neurone signs), decussating sensory fibres (pain and temperature) and the lateral corticospinal tracts (upper motor neurone signs)

Conus medullaris lesion causes wasting and weakness of muscles (lower motor neurone signs) supplied by the lower sacral segments (glutei), with sensory loss of buttocks and perineum.

Spinal cord terminates at lower border of L1 vertebra.

Anterior spinal arteries supplies corticospinal and spinothalamic tracts, and anterior horns of the grey matter.

3- In asbestos related disorders which of the following statements is correct?

- 1) basal fibrotic shadowing on CXR suggests coincidental idiopathic fibrosing alveolitis [0]
- 2) increased incidence of primary lung cancer [100]
- 3) pleural effusion develops more than 20 years after causative asbestos exposure [0]
- 4) pleural plaques are recognized precursors of mesothelioma [0]
- 5) the risk of malignant mesothelioma is greatly increased in smokers compared with non-smokers [0]

The risk of mesothelioma is not affected by smoking but smoking and asbestos exposure greatly increases the risk of lung cancer. It is pleural plaques which do not become apparent until 20 years or more after exposure. Pleural effusions may result from acute asbestos pleurisy. Pleural plaques are not precursors of malignant change, but they reflect previous asbestos exposure. Basal fibrotic changes suggest the presence of asbestosis as the fibres are fibrogenic.

4- A 64-year-old man is found to have squamous cell bronchogenic carcinoma. Which of the following statements is true regarding surgical resection?

- 1) An FEV1 of 2 L is a major contraindication to surgical resection. [0]
- 2) Hypercalcaemia makes further assessment for surgery unnecessary. [0]
- 3) Is precluded if a CT scan of the thorax shows enlarged mediastinal lymph nodes. [100]
- 4) Positive sputum cytology excludes the need for bronchoscopic examination of the airways. [0]

5) The presence of finger clubbing indicates that liver metastases are already present. [0]

Mediastinal lymphadenopathy is usually associated with a poor prognosis, although there may be a role for surgery and adjuvant chemotherapy in those with metastasis to ipsilateral mediastinal lymph nodes and subcarinal lymph nodes (N2).

Bronchoscopy is useful to identify involvement of carina or if tumour is within 2 cm of the carina which means the cancer is inoperable.

Patients are clearly operable on the basis of spirometry if FEV1 is greater than 1.5 litres for lobectomy and greater than 2 litres for pneumonectomy. For those with worse spirometric function may need full pulmonary function including transfer factor, and exercise testing.

Finger clubbing is related to HPOA, which is a non-metastatic manifestation of malignancy.

Hypercalcaemia may be associated with parathyroid-hormone related peptide production associated with squamous cell carcinoma (non-metastatic manifestation of malignancy).

5- Which one of the following statements is true of chronic obstructive pulmonary disease?

- 1) patients show at least a 15 per cent improvement in the FEV1 after nebulised bronchodilator [0]
- 2) inhaled corticosteroid usage does not improve long-term prognosis [100]
- 3) breathlessness is uncommon until the FEV1 falls to approximately 50 per cent of predicted [0]
- 4) emphysema is associated with increased transfer factor [0]
- 5) in advanced cases there is reduced pulmonary vascular resistance [0]

1- This level of improvement would mean the presence of asthma. 2- High dose inhaled steroids have been shown (ISOLDE) to improve quality of life and reduce hospitalisation rates by reducing the number of exacerbations, but it does not slow the rate of decline of FEV1 (hence does not affect prognosis). 3- Breathless is common but subjective. Mild COPD (60 - 79% predicted FEV1) are often unknown to their GP. Those with moderate COPD (40 - 59% predicted) are seen intermittently seen by GP, whilst those with severe disease (< 40% predicted) have frequent hospital and GP visits. 4- It is asthma which is associated with normal or increased transfer facotr. COPD is associated with decreased transfer factor. 5- COPD is associated with secondary pulmonary hypertension.

6- In herpes simplex encephalitis which of the following statements is correct?

- 1) brain MRI is characteristically normal [0]
- 2) temporal lobe involvement is common [100]
- 3) fits are uncommon [0]
- 4) cold sores or genital herpes are usually present [0]
- 5) viral identification by PCR on cerebrospinal fluid is non-specific [0]

MRI brain normally shows changes in the temporal lobes. Presenting features include fever, headache, vomiting, reduced consciousness and seizures. There may be dysphasia, hallucinations and peculiar behaviour. There are usually no skin manifestations of herpes simplex infections. The virus is rarely isolated from CSF but may be detected by PMR.

7 April 2003